

EDUCATIONAL PSYCHOLOGY

ARTHUR I. GATES

PROFESSOR OF EDUCATION, TEACHERS COLLEGE, COLUMBIA UNIVERSITY

ARTHUR T. JERSILD

PROFESSOR OF EDUCATION, TEACHERS COLLEGE, COLUMBIA UNIVERSITY

T. R. McCONNELL

PROFESSOR OF EDUCATIONAL PSYCHOLOGY, UNIVERSITY OF MINNESOTA

ROBERT C. CHALLMAN

CLINICAL PSYCHOLOGIST, MINNEAPOLIS, MINNESOTA

FORMERLY DIRECTOR, PSYCHOLOGY STAFF, MENNINGER FOUNDATION

THIRD EDITION

THE MACMILLAN COMPANY

Third edition, 1923 and 1948 by THE MACMILLAN COMPANY.

Thirteenth Printing, 1960

PREFACE

This revised edition of *Educational Psychology* presents a survey of the facts and principles of educational psychology which, in the opinion of the authors, will be of most value to students preparing for the teaching profession. As is explained in Chapter I, this treatment of educational psychology is different from a statement of the familiar "principles of general psychology" and suggested "applications." The present volume is the result of an attempt primarily to offer material which will help the teacher to see his professional activities with deeper insight and in broader relationships and to carry forward his work with more competence and satisfaction.

Certain objectives were followed for the purpose of making the book of the greatest possible professional value. In the first place, it was agreed that the most important problems of education should be brought forward and grappled with in the light of the findings of educational psychology even if the data were not as yet very extensive. Contrariwise, other issues would be omitted or minimized even if the experimental findings were very extensive and final. Thus, for example, the processes of acquiring meanings, or generalizing, thinking, and problem solving, and the problems of curriculum organization in the school studies and other areas are given far more attention than the principles of economy in rote learning.

It was agreed that the text should represent a candid statement and critical evaluation of available information. We have accordingly attempted to avoid exaggerating the practical values of the psychologist's devices, such as personality or intelligence tests, or the finality of the experimental evidence concerning various issues, such as the subject-matter-versus-integrated-curriculum controversy. We have endeavored, furthermore, to produce a text in which personal bias is reduced to a minimum.

These and other objectives were sought by arranging to have the book written by a team of four persons rather than by one. Educational psychology has advanced so rapidly in

certain special areas that no one person can be expert in all of them. It is hoped that a volume produced by a team representing a considerable degree of specialization will be more authoritative and valid (and less superficial and naive in certain areas) than a book written by one person is likely to be. Although all the writers of the present text are teachers of general educational psychology and are, presumably, familiar to a degree with the field as a whole, they differ in age, in the geographical locus and character of their undergraduate and graduate training, in their systematic leanings, and in their field of specialization. Each person was mainly responsible for the material in the field in which he has done intensive work, including teaching: Dr. Jersild, for Chapters II to VI, inclusive, which deal chiefly with child development, and Chapter XVII, a new chapter on evaluation; Dr. Gates, for Chapters VII and VIII, which are concerned with intelligence and various aptitudes, abilities, and disabilities, and Chapter XVI, which is concerned with tests, measurements, and other methods of appraisal and diagnosis; Dr. McConnell, for Chapters IX to XV, inclusive, which treat problems of learning with implications for teaching and for the organization of the school curriculum; and Dr. Challman, for Chapters XVIII to XXI, inclusive, which present the general field of mental hygiene and clinical psychology of the school child, and Chapter XXII, which deals with the mental health of the teacher.

The present text, however, is not a collection of four sections, each the independent product of one author. The book as a whole is the product of the team. Each section went the rounds of all authors for intensive critical review and was rewritten or revised, reviewed and revised again—in some cases several times. Indeed, after the four authors had completed their revisions, made in the light of the criticisms of the other writers, the entire manuscript was put in the hands of Dr. Adella Clark Youtz for an exacting and intensive study as was done in the case of the original edition of the book. Many minor and several major revisions suggested by her for the purpose of increasing clarity, avoiding undesirable repetition

or apparent or real conflict, etc., were made before the manuscript went to the printer. As a result of this teamwork, the material finally printed is appreciably different from, and, we believe, much more sound and useful than, the text which any one of us would have produced alone.

Each chapter contains a fairly extensive list of "References Cited in the Text." Care was exercised to include in each list references to a substantial number of representative investigations. This list should help the instructor introduce his students to a sampling of the important experimental studies upon which educational psychology is founded. The instructor will, of course, decide which of these to report in greater detail himself and which to ask the students to read.

Each chapter contains a group of "Questions and Exercises" for the students. These are designed primarily to foster critical thinking about the content, and applications of the data to various practical and theoretical situations. At the end of each chapter is also a list of briefly annotated references for further reading. In the main, this list contains titles of more comprehensive treatises on the various topics presented in the chapter. The guidance of the instructor concerning the kind and amount of supplementary reading to do will doubtless be appreciated by the students.

Certain other characteristics and purposes of this text are discussed in Chapter I because they are believed to be important for the student. In Chapter I, for example, it is suggested that the student need not wed any "system" of psychology and promise to "love, honor and obey" it until death do them part in order to profit by study of the subject. It is suggested, furthermore, that if any student feels strongly inclined toward a tie-up with one system, it will probably be better for him not to accept the first one that presents itself, but delay a final choice until he has made more and deeper acquaintances. The student is warned, moreover, that, although the authors have done their best to give the most valid interpretations and applications of the results of available research, future investigations will doubtless show them to have

been in error in some instances. For this and other reasons, they urge the students to attempt not merely to learn the facts and implications of educational psychology as presented in this text but especially to try to learn how to interpret the results of research and apply them to their own problems in the future. In pursuing such a purpose, the instructor's guidance in using current investigations will be invaluable.

We hope—and believe—that this text will be useful to students in teachers colleges and university departments of education who have previously had a course in general psychology. As stated above, the primary purpose of this book is not to present all the facts and principles of general psychology but to bring the results of psychological research and theory to bear upon the major activities and problems of the teacher. Its purpose is primarily to help teachers increase their professional competence and learn to utilize the findings of psychological study in the years to come. The volume for this reason should be useful also to teachers in service, who wish to resurvey the contributions of educational psychology. Although the book may be studied without fear of “too much repetition” of the typical introductory text in general psychology, it should be understood without special difficulty by teachers and students who have not had such a course. The authors have endeavored to make the volume stand on its own feet by avoiding unnecessary ambiguities and technicalities, by defining and illustrating unusual but necessary technical terms, and by making the text as lucid and unified as possible.

The authors are deeply indebted to many instructors who generously gave them advice for improving the book, based on their experiences in using it, and to many students who reported their likes and dislikes. In addition, each author secured an extensive report based on a thorough study of the first edition, from several experienced teachers. Among those making such extensive recommendations were Dr. Adella Clark Youtz, Lecturer in Educational Psychology, Teachers College, Columbia University; Dr. Eloise Boeker Cason, Director of Child Guidance, Bloomfield Public Schools, Bloomfield, New

Jersey; Dr. Rose Estrin Kushner, Instructor in Educational Psychology, College of the City of New York, New York; Miss Muriel C. Potter, Assistant in Educational Psychology, Teachers College, Columbia University; and Miss Rosalind Blum, Associate in the Guidance Laboratory, Teachers College, Columbia University.

On the basis of the experiences of these and many other instructors a good many additions, eliminations, and changes of emphasis have been made in the book. Although most of these are not apparent in the table of contents they will be obvious in the text to those who have used the preceding edition. Certain other changes will be obvious from the chapter headings. For example, Chapter XVII has been added to give an account of recent developments in the area of evaluation. The chapter on "The Adjustment of the Individual" in the first edition has been expanded into two chapters, the first of which carries the same title and the second the title, "Adjustment Process: Tension Reduction." Many of the other chapters have been extensively revised.

The authors are indebted to Mrs. Muriel Dalton and Mrs. Florine Blanco[†] for expert assistance in preparing the manuscript.

A. I. G.

CONTENTS

I. INTRODUCTION: THE SCOPE OF EDUCATIONAL PSYCHOLOGY	1
Characteristics of Educational Psychology in the Past	1
Characteristics of Educational Psychology Today	2
The Province of Educational Psychology	6
Relation of Educational Psychology to Schools or Systems of Psychology	9
Questions and Exercises	12
General References	13
II. THE DEVELOPMENT OF BEHAVIOR: INTRODUCTORY	15
Behavior at Birth	15
Some Characteristics of the Course of De- velopment of Behavior	20
Learning and Growth	23
Maturation and Training in Relation to • Mental Activities	29
Some General Characteristics of the De- velopment of Behavior	31
Summary	39
Questions and Exercises	43
General References	44
References Cited in the Text	45
III. PHYSICAL AND MOTOR DEVELOPMENT	48
Growth in Height and Weight and Bodily Proportions	48
Psychological Effects of Physical Changes in Adolescence	57
Motor Development	61
Handedness	70
Motor Development and Play Activities	71
Summary	76

Questions and Exercises	79
General References	81
References Cited in the Text	83
IV. EMOTIONAL DEVELOPMENT	85
Changes with Age in Emotional Susceptibility	89
Anger, Hostility, Vindictiveness	91
Fear	97
Pleasure	104
Affection	109
Laughter and Humor	113
Summary	114
Questions and Exercises	117
General References	119
References Cited in the Text	120
V. DEVELOPMENT OF SOCIAL BEHAVIOR	124
Parallels Between Social and Intellectual Development	133
Individual Differences in Social Response	135
Relative Potency of "Positive" and "Negative" Social Responses	141
Sympathy	142
Friendship	144
Resistant and Aggressive Behavior	147
Competition	150
Leadership	152
The Effect of Various Educational Provisions on Social Behavior	154
Summary	159
Questions and Exercises	163
General References	165
References Cited in the Text	167
VI. MENTAL DEVELOPMENT	173
Some General Characteristics of Mental Development	173

CONTENTS

xiii

Memory	176
Language Development	178
Development of Concepts and Reasoning	182
Daydreams and Dreams	192
Moral Concepts	200
Summary	201
Questions and Exercises	204
General References	206
References Cited in the Text	207
VII. THE NATURE AND MEASUREMENT OF INTELLIGENCE	212
Typical Tests of Intelligence	212
Mental Age and Intelligence Quotient	220
Statistical Analyses of the Nature of Intelligence	222
A Definition of Intelligence	225
Influence of Nature and Nurture on Individual Differences in Intelligence	226
Some Misunderstandings and Valid Conclusions Regarding the Nature of Intelligence and Intelligence Testing	235
Summary	240
Questions and Exercises	242
General References	243
References Cited in the Text	245
VIII. THE PRACTICAL USES OF INTELLIGENCE AND APTITUDE TESTS	247
The Range of Individual Differences in Intelligence	247
Intelligence and Scholastic Achievement	249
Intelligence and Particular School Subjects	253
Intelligence and Vocational Success	254
Intelligence and Social Adaptability and Leadership	257
Intelligence and Moral Adjustments	259
Conclusions	260
Special Abilities and Disabilities	261

Prognosis Tests	265
Uses of Intelligence Tests and Aptitude Tests	269
Summary	277
Questions and Exercises	279
General References	280
References Cited in the Text	281
 IX. THE GENERAL NATURE OF LEARNING — I	 284
Needs and Opportunities for Learning	284
Definition of Learning	288
Learning and Maturation	290
Process of Learning	295
Intent to Learn	298
Motivation	300
Summary	307
Questions and Exercises	310
General References	311
References Cited in the Text	312
 X. THE GENERAL NATURE OF LEARNING — II	 315
Features of Learning in Complex Tasks	315
<i>The Law of Effect</i>	318
Learning as Goal-Directed Activity	319
Insight	322
Organization in Learning	326
Differentiation and Integration	327
The Importance of Relationships	331
Summary	332
Questions and Exercises	335
General References	337
References Cited in the Text	338
 XI. PRINCIPLES OF GUIDANCE IN LEARNING — I	 340
Principles of Guidance in the Acquisition of Skill	341

CONTENTS

xv

Essentials for Continued Improvement of Skill	349
The Value of Verbal Methods of Tuition	352
The Learning Curve	353
Summary	361
Questions and Exercises	362
General References	364
References Cited in the Text	365
XII. PRINCIPLES OF GUIDANCE IN LEARNING — II	367
Principles of Guidance in the Acquisition of Verbal Abilities	367
The Influence of Success or Failure	381
Retention after Verbal Learning	392
Summary	403
Questions and Exercises	404
General References	407
References Cited in the Text	408
XIII. THE DEVELOPMENT OF MEANINGS	412
Meaning the Central Problem in Educational Psychology	412
Difficulties in the Course of Developing Meanings	416
The Improvement of Understanding	423
Abstraction and Generalization	430
Summary	440
Questions and Exercises	441
General References	443
References Cited in the Text	444
XIV. REASONING AND PROBLEM SOLVING	446
The Nature and Development of Reasoning Ability	446
The Characteristics of Problem Solving	449
Activities Involved in Reasoning and Problem Solving	451

Becoming Aware of the Problem	452
Defining the Problem	453
Locating, Evaluating, and Organizing Information	455
Discovering Relationships and Formulating Hypotheses	459
Evaluating Hypotheses	463
Applying the Solution	466
Formulating Methods of Reasoning and Problem Solving	467
Reasoning and Problem Solving in the Area of Propaganda	469
Creative Imagination	472
Summary	475
Questions and Exercises	479
General References	482
References Cited in the Text	483
XV. TRANSFER OF TRAINING	485
Theory of Mental Faculties and Formal Discipline	486
Recent Theory and Research on Transfer	493
The Importance of Generalization	498
Negative Transfer	512
The Relative Values of Different Subjects	513
Summary	515
Questions and Exercises	516
General References	518
References Cited in the Text	519
XVI. APPRAISING PROGRESS BY MEANS OF TESTS AND OTHER DEVICES	522
Nature of Objective Tests	524
Types or Aspects of Ability Measured by Standardized Tests	527
The Use of Derived Scores and Norms	531
Essential Characteristics of a Good Test	535
The Choice of Objectives to Be Measured	536

CONTENTS

xvii

Validity	538
Reliability	540
Economy and Usability	542
Effects of the Experience Upon the Pupil	543
Standardized Achievement and Diagnostic Tests	543
Types of Standardized Tests Now Available	547
Teacher-Made Objective Tests	552
The Essay Examination	556
Analysis of Errors	559
Observation of Activities	560
The Diagnostic Inventory	561
The Specialist's Case Study	563
Summary and Conclusions	565
Questions and Exercises	567
General References	569
References Cited in the Text	570

XVII. APPRAISING THE SCHOOL PROGRAM THROUGH STUDY OF PUPILS AS PERSONS	572
Study of Pupil Behavior in the Modern School	572
Observation	576
Anecdotal Records	578
Ratings and Evaluations by Pupils	581
Tests of Personality and of Emotional Adjustment	588
Rating Scales for Use by Teachers	590
Conversations and Interviews	592
Projective Techniques	593
Approaches to the Study of Attitudes	598
Approaches to the Study of Children's Interests, Wishes, Likes, and Dislikes	601
Summary	604
Questions and Exercises	607
General References	608
References Cited in the Text	608

XVIII. THE ADJUSTMENT OF THE INDIVIDUAL	614
General Nature of Adjustment and Maladjustment	614
The Needs and Goals of the Individual	617
Characteristics of Needs and Goals	619
The Interrelation of Needs	622
Sources of Frustration or Thwarting	625
Factors Affecting Responses to Thwarting	628
Emotion as a Reaction to Frustration	635
The Effects of Humiliation	637
Motivation of Behavior	638
Learning, Needs, and the Adjustment Process	639
Summary	641
Questions and Exercises	642
General References	643
References Cited in the Text	644
XIX. THE ADJUSTMENT PROCESS: TENSION REDUCTION	647
Direct Methods of Tension Reduction	647
Renewed Attempts to Reach the Original Goal	647
Substitution of Other Goals	649
The Process of Problem Solving: Analysis and Decision	652
Indirect Methods	655
Sublimation	656
Withdrawal	658
Identification	665
Becoming Dependent	667
Rationalization	668
Repression, Projection, and Reversal Formation	672
Expiation and Atonement	678
Compensatory Methods	679
Aggression as a Method of Tension Reduction	680

CONTENTS

xix

Illustration of the Use of Direct and Indirect Methods	689
Further Evaluation	691
Summary	692
Questions and Exercises	693
General References	694
References Cited in the Text	694
 XX. MENTAL HEALTH HAZARDS OF THE SCHOOL CHILD	 697
Extraschool Influences: The Parents and Family Life	697
Parents Who Reject the Child	699
Parents Who Overprotect the Child	703
Parents Who Show Favoritism	706
Parents Who Have Inordinately High Moral Standards	707
Other Damaging Family Conditions	708
Frequency of Harmful Family Conditions and Their Effect on the Adult Personality	708
Extraschool Influences: The Community	710
Effect of School Practices on Children's Behavior and Personality	713
Improvement in Handling Behavior Problems in the Classroom	720
Children with Special Problems of Adjustment	721
Summary	726
Questions and Exercises	727
General References	728
References Cited in the Text	729
 XXI. GUIDANCE OF THE INDIVIDUAL CHILD	 732
Adjustment Schedules	732
Projective Techniques	740
Methods of Observation	741

Interviewing Parents	743
Conferences with the Pupil	745
Interest Inventories and Analyses	745
The Cumulative Record	746
The Case Study	746
The Role of the Teacher and the Specialists in Aiding the Adjustment and Readjust- ment of the Child	753
The Evaluation of the Seriousness of Mal- adjustments	753
Aiding the Adjustment and Readjustment of the Child	755
Summary	760
Questions and Exercises	761
General References	762
References Cited in the Text	763
XXII. THE MENTAL HEALTH OF THE TEACHER	765
The Teacher as Adult	765
The Teacher as Teacher	773
Aspects of Teaching Conducive to Mental Health	774
Sources of Dissatisfaction in Teaching	776
Ways of Improving the Mental Health of the Teacher	786
Summary	793
Questions and Exercises	794
General References	795
References Cited in the Text	796
INDEX OF AUTHORS	801
SUBJECT INDEX	809

EDUCATIONAL PSYCHOLOGY

CHAPTER I



INTRODUCTION: THE SCOPE OF EDUCATIONAL PSYCHOLOGY

CHARACTERISTICS OF EDUCATIONAL PSYCHOLOGY IN THE PAST

Educational psychology has developed rapidly during the past quarter century. The nature of this growth would be apparent to anyone who compared with the present book a volume called *Psychology for Students of Education*, written in 1922 by one of the present authors (Gates). The student may be interested to read a couple of the introductory paragraphs in the older book. Following is the opening passage which sought to indicate the value of general psychology:

By the use of methods similar to those employed in the natural sciences, psychology attempts to solve many of the problems concerning human behavior which have long been treated in less exact fashion. Teachers, physicians, lawyers, preachers, business executives, in fact, people in all walks of life attempt to understand, as best they may, by observing their own impulses, feelings, thoughts, and acts, as well as the behavior of others, the general characteristics of human conduct, and the peculiar traits of particular individuals. As a result of our observations, most of us have acquired notions concerning the motives which may be relied upon to stir us or others to action; concerning the acts and situations which please and displease; concerning the signs by which emotions and thoughts are made manifest. We have acquired methods of estimating traits of character such as honesty, sociability, ambitiousness, and traits of mind, such as alertness, depth, and sagacity. We have convictions concerning the relative mentality of men and women; concerning the temperaments of negroes and whites; concerning the learning capacity of children and adults. We have beliefs about the influence of the weather, fatigue, or coffee upon efficiency in thought or skill.

Long the subject of ordinary speculation, these problems and many similar ones when attacked by scientific methods constitute psychology.

This paragraph about the nature of psychology might be used as a preface to a current text in "general" psychology, but the following paragraph from the same book is definitely out of date as a description of the character of educational psychology.

In a Psychology for students of education most of the laws and principles which constitute General Psychology will be utilized. Of the innumerable particular facts gathered in the several branches of the science, many of them—of use to the physician, the lawyer, the advertiser, the salesman, the musician, or other people—are of relatively little importance for the student of education. The following chapters will include those principles and many of the particular facts from psychology (and many borrowed from other sciences, as well) which seem to have the most important bearing on education.

The implications of this passage are worth noting. First, note the implication that the earlier book offered chiefly the applications of the *principles* of *general* psychology to education, and certain detailed facts and experiments from psychology, which should prove illuminating to the teacher. The second is the correlated suggestion that educational psychology consisted of little more than such applications and data, and that it had no subject matter or area of operations of its own. The third is the suggestion that the really distinguishing feature of the data reported in the volume was the method employed in developing them. The book was considered to be a report of the educational implications of data gathered by *scientific method* as employed by psychologists.

CHARACTERISTICS OF EDUCATIONAL PSYCHOLOGY TODAY

A Critical Attitude toward Application of General Principles. The quarter century that has passed since these two paragraphs were written has produced marked changes in

educational psychology. In the first place, it may be said that although the principles of general psychology are drawn upon extensively and frequently "applied" to education by figuring, mentally, what they would probably mean in educational practices, there is now an extensive literature describing the results of actual experimental tryouts of the suggested applications. In many instances, moreover, it has been found that the applications did not work out very well. As a result, we now consider very critically all statements that a psychological principle applied to this educational situation means that we do so and so. Especially is this true of the many applications made by psychologists and others whose acquaintance with school objectives, practices, and methods is rather casual.

Applications Themselves Must Be Subjected to Experimental Test. The sophisticated educator now wants to be shown. In this respect, he is like the shrewd physician who frequently hears how a suggested practice, derived from some principle or fact, would probably work. Large doses of a certain vitamin, said a biochemist some years ago, would probably increase assimilation and stamina greatly. The better physician waited for a test of the idea, first on animals and then on human beings, before feeding large doses of this vitamin to his patient. Later another biochemist said that large doses of certain vitamins would probably greatly increase the learning ability of many children. The modern educator should wait for a demonstration. Experiments designed to test this possibility are, in fact, being made. Thus, today there is wide recognition of the importance of determining the validity of the application of general principles to educational practice. Educational psychology assumes a large responsibility for this function of trying out, experimentally, the application of general psychology to education. A large and important literature of reports of such tests has already been accumulated, and extensive enterprises are now under way.

Educational Psychology Now a Field of Specialization. Educational psychology is, however, not confined to the verification of applications of principles to education. It has built

up in several areas programs of study of educational problems which general psychology does not deal with in any comprehensive way. Such areas as the teaching of the school subjects, and especially the conducting of the newer types of activity programs and projects; the diagnosis and remediation of educational difficulties; the newer types of evaluation of educational attainments; the improvement of practices in nursery school, adult education, and educational guidance—these are examples of fields of specialization for educational psychologists. These are fields that general psychology touches in only a limited way.

The Practical Viewpoint in Educational Psychology. Both in trying out the implication of principles of general psychology and in investigating other problems in education, the educational psychologist adopts a special, professional point of view which differs somewhat from that characteristic of the general psychologist. The latter typically directs his investigations to find or verify a general hypothesis or principle. The former is often chiefly concerned with the task of finding or verifying a practical solution to a problem. In the case of the psychologist, the purpose is to build up a body of general scientific principles. In the case of the educational psychologist, the purpose is to develop professional practices of maximum value. To illustrate: the writer once asked a general psychologist, who had spent many years in productive research, to give his opinion concerning certain practical applications of his theories to certain educational practices. He replied that he could not express an opinion since he had not as yet given his attention to practical applications. On the other hand, the writer once asked an educational psychologist, who had made many studies of the teaching of a school subject, what bearing his findings had on certain hypotheses in the psychology of learning. He replied that he had not as yet thought the matter through.

These illustrations, however, picture the extremes. Some general psychologists are extremely "academically minded," and some educational psychologists are extremely "profession-

ally minded." There is no objection to such specialization if the extremists themselves and others, too, recognize their unique strengths and limitations. It is, however, very important that a sufficient number of competent persons be active in bridging the gap between the general theories and the professional practices. The educational psychologists, at least many of them, should attempt not only to find the best professional practices but also to see clearly the bearing of their results on the general theories. General principles can often be derived as validly, or even more validly, from studies conducted in genuine educational situations as from research conducted in the more artificial and restricted settings of the laboratory of general psychology. The typical defect of the laboratory is the oversimplification of the situation resulting from efforts to secure better control; the typical defect of the natural school situation is the obscuring of the main principles by the complexity of the practical setting. In the long run, both types of attack are desirable. If the professional suggestions contained in the academic studies and the theoretical implications of the professional investigations are carefully and skillfully extracted, both general theory and professional practice will become more meaningful.

A Suggested Attitude toward Principles. In this case, the policy most useful for the investigators is a desirable one for the student to adopt. He should, in other words, try to learn to see the practical educational implications of various general theories and principles and the theoretical implications of demonstrated differences in results arising from various practices. A major purpose of this book is to help the student acquire such skill and insight. The volume will present many general principles and theories and suggest their educational implications. It will give particular attention to cases in which suggested implications have been put to the test by special experiments set up for this purpose. It will also review the results of many experimental studies of professional practices, especially those in which two or more procedures are compared, and attempt to point out the bearing of the results on

the validity of general theories and principles as well as upon particular practices in the daily work of the schools.

Learning to Evaluate and Use Reports of Research. In this way it is hoped that the student will acquire not only a fund of information concerning the best practices and the general theories underlying them but also, and especially, greater skill in interpreting both types of data. In the course of a professional life, the latter will probably prove to be more important than the former. Skill in interpreting the results of all types of studies, ranging from those extremely theoretical in design and purpose to those extremely practical, will provide the means of utilizing the results of research in later years. Keeping abreast of later research will clarify much that is now obscure, open up areas now barely touched, and, no doubt, yield true interpretations to replace many erroneous conclusions now tentatively or even confidently accepted.

There are doubtless many statements in this book which will bring blushes of embarrassment to any one of the writers who reads them twenty years hence. This is inevitable. On many matters of theory and practice we must now make statements on the basis of insufficient data and, needless to say, we are far from omniscient. A vigorous science, such as educational psychology now is, moves very rapidly, and new developments, many of them unforeseen at present, are certain to occur. The business of the student is to learn how to keep abreast of them. Study of this book, it is hoped, will help the student achieve this purpose.

THE PROVINCE OF EDUCATIONAL PSYCHOLOGY

As a definitely recognized field of specialization, educational psychology has only a short history. Many persons think of it as beginning with the appointment of Edward L. Thorndike, Charles H. Judd, Lewis M. Terman, and others to definite university posts to cultivate the field. These men began their work in the field shortly after 1900. Although it took these exceptional pioneers little time to get going at full speed, it required considerable time for so few of them to explore even

the major areas in education. Only since about 1920 has educational psychology begun to take very definite form, and its province is continually changing as the result of the development of new concepts and tools within the science and the appearance of new objectives and needs in education. For example, the discovery by psychologists of the possibilities of education in the nursery school at the one extreme and in adult life at the other has added two new and vastly complex areas. Similarly, the recently developed conviction of educators that the schools must definitely teach children to live and love "the democratic way of life" has opened up a field of investigation as subtle as it is important. Thus, although educational psychology now embodies a number of well-recognized fields of operation, its boundaries are neither very definite nor stable.

Boundaries Uncertain and Changing. Writers of textbooks and teachers of college courses in educational psychology sometimes become a bit impatient with the uncertain boundaries of educational psychology and want to call a meeting to define the field. Such an enterprise could be of only temporary value if, indeed, it did not do more harm than good. It is probable that a meeting for the exactly opposite purpose, namely, to suggest new needs that should be met and new fields that should be entered, would be more fruitful. J. McKeen Cattell, one of the great pioneers in psychology (whose work has contributed greatly to the development of educational psychology), when asked to define psychology, said: "Psychology is what psychologists do." This characterizes, if it does not define, educational psychology. And no one knows what psychologists may do even in the next decade.

Topics Covered in the Book. At the present time, the variety of problems investigated by educational psychologists are so numerous that they could not all be presented in a text twice the size of the present book. What is offered in this volume is a fairly extensive survey with emphasis upon the findings judged by the authors to be most important for the teacher. The reader can get a good idea of the topics covered and also secure a notion of the whole report which will be

beneficial in his later study by doing two things: first, by reading the table of contents a time or two and, second, by skimming the summaries and glancing at the titles of books recommended for further reading, both of which appear at the ends of the chapters. An hour or two spent "skimming" the entire book will probably also give the student a notion of the subject as a whole which would bring out more and richer relationships in later study than would be possible in a strictly piecemeal approach.

The student who examines the whole book in a preliminary survey will appreciate the wide range of topics covered in the field. The large number of books on special topics—child development from birth to six years; development from six years to twelve; development during adolescence; the psychology of adult life; the psychology of old age; the emotional life of the child; the psychology of social adjustment; intelligence testing; aptitude testing; achievement testing; vocational testing; the psychology of reading, of algebra, and many other special subjects; psychology and curriculum; diagnosis and remedial work; personality development; clinical psychology; the psychology of the gifted, to name a few—suggests the task faced by the authors of a comprehensive text. The situation implies also the reason for having four authors join forces in preparing this text.

In developing this volume, each author wrote the material in a field to which he had given special attention for a period of years. Each of these is a rather broad field. They may be roughly described as:

1. Mental, physical, and emotional development from birth to maturity.
2. The process of learning; thinking and reasoning; the art and technique of teaching; and problems of curriculum organization.
3. The measurement of intelligence and special abilities; the diagnosis of special disabilities; and the appraisal and evaluation of the progress of learning.
4. Personality adjustment and development; the techniques of diagnosis and remediation of maladjustment; the problems of

handicapped pupils; and the mental hygiene of the pupil and the teacher.

Although all the authors were familiar with all four areas, the fields are so specialized that, we found, any one of us could be easily caught off base in another's field. Each, however, reviewed as critically as was possible—or, shall we say, as critically as he dared—the first draft and the several revisions through which the material passed before the final publication of this revised edition.

RELATION OF EDUCATIONAL PSYCHOLOGY TO SCHOOLS OR SYSTEMS OF PSYCHOLOGY

In educational psychology there are, as in general psychology, several general views or schools or systems. Behaviorism or conditioned response psychology; gestalt or organismic psychology; connectionism or stimulus-response psychology—these are familiar ways of referring to three systems or, more accurately, three groups of systems much under discussion at the present time. The four authors of this book were trained in different places and undoubtedly differ more or less in their attitudes toward the systems of psychology. That none is very extreme is indicated by the fact that the book was finally finished. Ardent apostles of different schools of psychology could probably never finish a joint volume that they could all approve in detail. The authors, in the present case, were able to agree for two reasons upon what is offered in the volume. First, each viewed the various systems or schools as merely varieties of expression of general hypotheses and not as rival cults, one of which must be accepted once and for all and defended to the death. Second, they feel that, as far as the professional applications are concerned, the differences between the schools are not very clear or very great.

This Book is Nonsectarian. That the differences either in theoretical or practical implications of the several systems have been vastly exaggerated by the extremists was illustrated very well when a group of psychologists and educational psycholo-

gists under the chairmanship of one of the authors of this book, Dr. McConnell, worked together for more than a year in an attempt to arrive at the real similarities and differences in theories of learning.* Insofar as the important professional applications were concerned, the more thoroughly the rival systems were examined the greater became the similarities and the less the differences. This is not to deny that there are differences in emphasis in the applications to education. The experiences of the four authors of this volume were similar. They found, in the end, that their views on all important matters were essentially in agreement—and they reached this happy state without any very serious casualties en route. This does not mean that there are not differences among them in emphasis on several points. At first thought, this might seem to result in an unsystematic treatment of the subject. We believe, however, that it is not unsystematic; it is merely non-sectarian. This book does not ardently espouse any one system of beliefs.

For two major reasons this book makes no attempt to present a complete, systematic discussion of the several schools of psychology. The first reason is implied in the preceding paragraph. For the professional worker, few important differences can be demonstrated. The second reason is that it is very difficult to present the various systems fully and clearly in brief form to readers who are not already quite familiar with the basal data of the science. Study of the systems is much more meaningful and profitable when the student is more advanced in psychology.

Several Schools of Psychology Cited. The present book, it is hoped, includes facts, principles, and applications in a form acceptable to persons with preferences for any one of the major systems. Certain distinctions among the theories will be considered in particular contexts which provide especially clear and useful illustrations. Thus something of the flavor of differ-

ent points of view will appear without an effort to develop a complete systematic presentation.

The Choice and Use of Technical Terms. Educational psychology, like other sciences, has a technical vocabulary, that is, a number of terms each of which is used with a specific meaning. Although the various schools or systems of psychology have many terms in common, each system also has a number that are employed rather exclusively. There are, in fact, some instances in which certain words are used in two or more systems with somewhat different meanings and a larger number of cases in which essentially similar ideas are expressed by quite different terms. This situation raises certain difficulties for the student engaged in reading books or articles written by the representatives of different systems. The authors of the present volume have tried, in the choice and use of technical terms, to make understanding of the book as easy and clear as possible and at the same time to contribute to the ease and clearness of reading other books. A few words about the method adopted may be given together with a hint or two for the student.

In the first place, the authors have selected the terms that seemed to them most clearly suggestive or descriptive of the fact or principle or situation they were trying to present. An effort has been made to avoid those terms which tend to give misleading implications to the student or which are devoid of helpful clues. As a consequence terms that originated in different systems appear. In certain instances, especially in the second half of the book, mention is made of terms, other than those chiefly used in this book, that are commonly used in other books or systems. If this policy is carried out well, it will enlarge the student's vocabulary with a minimum of difficulty. It should make the reading of other books, such as those recommended in the lists at the end of each chapter, more easygoing. It should give the student a considerable familiarity with the most essential technical vocabulary of all the major theoretical systems. And here is a suggestion for the student.

As you read this text, take a careful look at the terms when

several words or phraseology with similar meanings are presented. Make a game of comparing them and keeping them in mind. It will help you not only with this book but with other readings in psychology and related fields. Prominent writers and speakers in education, for example, make considerable use of the technical expressions of psychology. That some of them, alas, use them with meanings all their own makes it no less important to know in advance what the proper meanings are. To master some of the technical terminology and phraseology commonly used in psychology and educational psychology, as well as the facts, principles, and methods, is to become equipped with tools essential for constructive work in one's professional career in education.

QUESTIONS AND EXERCISES

1. Why is there always a degree of uncertainty in "applying a principle" established in a laboratory experiment to actual classroom situations?
2. Does the chapter imply that there is more or less scientific study of educational problems now than there was twenty years ago?
3. In many psychological experiments the method of learning a poem as a "whole" has proved more effective than learning it "piecemeal." Does this mean the "whole" method of learning should be used in learning all types of material in school? Why?
4. Formulate two problems which would lie directly in the field of specialization of the educational psychologist rather than in that of the academic psychologist.
5. Do you believe that the science of chemistry is divided into opposing "schools" of chemistry? Why do you think we have "schools" of psychology?
6. Why is it probably easier to understand the various schools or systems of psychology after one is familiar with the main data of the science than it is before these data are known?
7. What evidence for the growth of adult education have you observed? How do you account for this growth?
8. Criticize the following conclusions in the light of scientific methods.

- a.* A man asserted that women are emotionally unstable because his sisters are more often "upset" than he is.
 - b.* The fact that college graduates earn larger salaries at forty years of age than persons of the same age who did not go to college proves that a college education increases one's earning power.
 - c.* The fact that the best reader in the class was taught by the phonetic method proves that this method is better than that applied to any other member of the class.
 - d.* The fact that the oldest living inhabitant of the state has smoked since he was fifteen years old proves that smoking increases the length of life.
9. What, if any, are the distinctions between a hypothesis, a theory, a law, a principle? What is the difference between a scientific law and a civil law?

CHAPTER II



THE DEVELOPMENT OF BEHAVIOR: INTRODUCTORY

A child's education begins as soon as he is born. His first curriculum consists of his contacts with adults, the ways in which he is handled and cared for, and the sights, sounds, and other sensory stimuli that impinge upon him. Many of the experiences that play a part in shaping his habits and molding his character arise incidentally, without plan, in the course of his daily care. But from the beginning his elders have countless dealings with him that affect his everyday experiences and that thus are a feature of his education.

As the child's abilities mature, the acts and provisions that constitute his education increase apace. To be most effective, his education throughout the course of his development must be adapted to his own ways of growing and learning. For this reason, a study of the development of children is of primary concern to educational psychology.

The immediately ensuing chapters will deal with various aspects of development. The present chapter will describe characteristics of the child at birth and some general principles or characteristics of development.

BEHAVIOR AT BIRTH

The child is capable of behavior long before his expectant mother notices his stirrings. Much has been learned concerning prenatal behavior from a study of infants who, by some mischance, have been delivered before normal term.

The beating of the heart has been noted for the first time as early as three weeks after the time of conception. The processes involved in respiration and digestion are prepared to

function several weeks in advance of the time of normal delivery. At about the third month of prenatal life many activities involving the skeletal muscles have been noted, and the range of such activities increases during ensuing months.¹

These early movements of the skeletal muscles are under the control of "subcortical" centers in the nervous system—the spinal cord and brain stem as distinguished from the cerebrum. The higher brain centers, which eventually play so important a role in human behavior, are relatively backward in their development. During the later months of prenatal life there is evidence of the beginning of the functioning of the cerebral hemispheres, but at the time of birth these structures are as yet undeveloped as compared with the "lower" centers, and are not functioning appreciably in relation to many performances which they eventually will control.²

"Mass Activity" and Generalized Response. In the behavior of the infant during the first days of life there is a large amount of diffuse activity. Movements of the arms, legs, trunk, and head, often combined with crying, may be so rapid and profuse that an observer is quite unable to note them in detail. The term "mass activity" has been used to describe such movements.³

Likewise, even some activities that appear to be quite well established at birth are less clearly defined than will be the case at a later time. For example, the healthy child can do a good job of sucking, but sucking movements will occur not only when an object is placed in contact with the baby's lips, but also occasionally in response to other stimulation, such as pulling the infant's hair or pinching his toes.⁴ A stimulus applied to almost any part of the body may produce a response in almost any other part of the body. As time passes, movements become more specific and more clearly differentiated. But this does not mean that all is confusion at the start. From the beginning some activities are more clearly defined than others. Moreover, movements are likely to be most marked in the parts immediately affected (as in the leg when the foot is pinched), or in a part already set to respond (as when the child,

with a nipple already in his mouth, resumes sucking when his foot is pinched).

The Mental Life of the Newborn Child. Many theories have been raised concerning the nature of the child's impressions during the first days of life. James, a famous psychologist, opined that "the baby, assailed by eyes, ears, nose, skin, and entrails all at once, feels it all as one great, blooming, buzzing confusion." ⁵ On the other hand, it has been claimed that the child is capable from the start of rather definite "psychic" experiences; that the rigors of birth have a profound effect upon him, that strong emotional impulses such as fear, rage, and love are there from the beginning. Such views, however, cannot be accepted as established fact. We have no direct way of finding an answer to the question as to what is going on in the child's mind, but some points may be noted.

The very fact that the child at birth or very soon thereafter is equipped to respond (although not in the manner of an older person) to stimuli that come to him by way of sight, hearing, taste, and bodily contact suggests that the beginnings of impressions of some sort are being established. In conjecturing what these impressions may be, we must, however, take account of the child's limitations. As far as vision is concerned, for example, he is capable of only fleeting regard for an object. It will be many weeks before the ability to fixate and follow a moving object with well-coordinated movements of both eyes will be fully established. The fact, as noted above, that a sensory stimulus is likely to set off a good deal of generalized response also suggests that impressions from the various sense organs are not as clearly defined as will be the case in time. Further, whatever may be the nature of the child's experiences, they cannot have the same meaning as will be attached to them in time, for the child lacks the background of experiences in terms of which the impressions that flow in upon an older person are recognized and interpreted.

Early Signs of Learning. In spite of such lacks and limitations, the child is a learner practically from the time of his birth. Within the first few days of life the hungry baby who

formerly cried until he was fed may cease his crying in response to happenings previously associated with feeding, such as the sound of his mother's approach, or the sound of her voice, or the experience of being taken into her arms. Within the first couple of weeks, he may become accustomed to a certain feeding schedule (such as being fed every three hours) and then, if his feeding is delayed for an hour, show much more agitation than another child who, from the beginning, has been fed every four hours.⁶ The amount of learning that takes place during the months following birth is staggering and incalculable. Countless sights and sounds and contacts acquire meanings of their own.

Early Learning in Relation to Personality Formation. Learning takes place early even in connection with what we call a child's "temperament" or "personality." For example, a child whose mother is a slave to the clock, or who has other rigid notions about how a child should be reared, may learn early in life that he can get attention only if he cries vociferously and this, conceivably, might be the beginning of a tendency to cry excessively. It is possible that a child whose mother is usually abrupt or impatient or easily annoyed may, at an early age, acquire qualities of resistance and defensiveness in his behavior, differing from qualities acquired by a child whose parent is usually gentle and serene. The parent may be quite unaware of what is happening, and the child may only dimly perceive and soon forget. But his conduct and his attitudes are of necessity influenced to some degree by the events that befall him from day to day. This does not mean, of course, that the child's personality development is completely at the mercy of early experiences of this sort. As noted more particularly in Chapter V, children at an early age show differences in personality traits, such as the tendency to be irritable or placid or timorous, in ways that cannot be accounted for solely by differences in the treatment they receive from others.

Extent of Learning in the Dear but Not-So-Dead Days Beyond Recall. While the amount of learning that takes place during early childhood is tremendous, the child has little recol-

lection in later life of the experiences through which this learning took place. Few adults can remember anything that happened in their lives before the age of two.⁷ Many are unable to recall anything that happened before the age of three. Yet note how far a human being has gone in the school of life by that time. He has mastered many of the intricacies of language. He can use several hundred words and he understands many times that number: this fact alone shows how rich already is his mental life. He has a vivid imagination and images arise not only in his waking moments but also in his dreams. He has acquired a vast array of skills. His emotional life is highly complicated. His fears and resentments, his attitudes of friendliness or hostility, suspicion or trust toward other people have been profoundly influenced by his past experience. He has acquired many tastes and preferences with respect to food and other things. He has been schooled in notions of good and evil and already he may possess highly charged attitudes with respect to fighting, breakage of property, sex, cleanliness, and the like.

His life, by the age of three, has encompassed all this and much more—yet all or nearly all of this period of his life is lost in oblivion. But the habits, attitudes and tendencies he has acquired influence his behavior whether or not he remembers their origin. This does not mean, of course, that his personality is set, once and for all, for a person learns as long as he lives and his ways of thinking and feeling are continually being modified. But in this process of learning each new experience is received, interpreted, welcomed, or opposed in terms of what has gone before. The fact that a child is not fully cognizant as to what these terms are during the first years of life makes it all the more difficult to explain many of his actions. The curtain that conceals his early life is one factor that sometimes results in behavior at the adult level that is baffling to the person himself and puzzling to others.

It is little wonder that from time to time, in the history of human thought, efforts have been made to find ways of looking behind this curtain. In recent years, such efforts have been made most notably by psychoanalysts. The fact that many of

the answers given by psychoanalysts are regarded as lacking in scientific proof does not minimize the importance of the questions that prompted them.

SOME CHARACTERISTICS OF THE COURSE OF DEVELOPMENT OF BEHAVIOR

Some general characteristics of development during prenatal life and after the time of birth will be discussed in the immediately ensuing paragraphs. Other general characteristics will be discussed in succeeding chapters.

Progress from Generalized to more Localized and Precise Behavior. As already noted above, one characteristic in the development of behavior is an advance from generalized to more specific forms of response. During the first days of life a pinch on the leg, for example, may produce not only a movement of the affected limb but also movements in other parts of the body. As time passes, response to a similar stimulus (unless it has a startling effect) is likely to be restricted more and more to the affected limb.

An illustration of this trend toward more precise, specialized behavior is provided by observations of the response of infants to a pinprick: *

In the "newborn" phase, the response (when it first occurred; some children do not react during the first hours or days of life to a pinprick that will produce a reaction later on) consisted of diffuse bodily movements accompanied by crying and sometimes by reflex withdrawal of the affected part of the body. Succeeding this there was a period during which there was noticeable lessening of diffuse movements, without signs, however, of ability to identify the affected part of the body. In the next phase, the infants began to localize, within broad limits, the area where the stimulus was being applied: when the leg was stimulated, for example, there was a seemingly deliberate withdrawal of the leg from the pin, as distinguished from an earlier form of reflex withdrawal. Succeeding this, there was evidence of a gradually increasing ability to identify the specific point of irritation, as shown, for example, by the

fact that the infant brought his hand to the stimulated part (when the stimulus was applied in the upper region of the body) and, with the further passage of time, tried to rub the affected area or to push the pin away.

Individuation. In the foregoing we have seen that the process of differentiation may take the form of a dropping out of diffuse movements that originally occurred in connection with a given response. It may also take the form of differentiation of movements from previously more inclusive or "total" reactions. The term "individuation" has been used to identify this phenomenon.⁹ An example of such "individuation" is provided by the operation involved in picking up a small object with the thumb and forefinger. During the first months of life the child is not capable of using the thumb and forefinger separately; movements of these two members are at first bound to a larger movement involving the entire hand.* But within a few months the child is able to use the thumb and forefinger in an independent movement.

"Direction" of Development. Generally speaking, the development both of bodily structure and of bodily functions proceeds in a cephalo-caudal direction, or from the head tailward. Jackson and Scammon¹⁰ have pointed out that, while each part of the body "passes through its own cycle of changes, these changes on the whole tend to follow what is known as *the law of developmental direction*: for it is generally found that development (including growth and differentiation), in the long axis of the body, appears first in the head region of the body and progresses toward the tail region."

On the anatomical side, illustrations of this process can be noted in the fact that during prenatal life the arm buds appear before the leg buds and that development in the head region is in advance of development in the leg region. Simply from the point of view of size, the head at the time of birth is de-

* Examples of both individuation and lack of complete individuation can be noted at the adult level if one tries to flex his fingers as he holds his hand in front of him, palm upward. Note that it is possible to move the thumb independently but that when one tries to flex the little finger it is likely that the adjacent finger also will move.

cidedly larger, in proportion to its mature dimensions, than are the trunk or the lower extremities.

The development of behavior shows roughly the same sequence. The child is capable of quite skillful use of his arms and hands before he can make much use of his legs or feet. This does not mean that development is complete in the upper or anterior regions of the body before it begins in the lower or posterior regions, but rather that the former tends to be in advance of the latter. A further illustration of this fact appears in findings (by the Shermans¹¹) concerning pain sensitivity in response to being prodded by a needle. During the first hours of life, it required fewer proddings of the skin of the head and neck than of the leg to elicit a response.

Development also tends to proceed from the trunk outward toward the extremities. Generally speaking, this means that development in the part of the limb which is proximal, or next or nearest to the main axis of the body, takes precedence over the more remote or distal parts. For example, voluntary movements involving the use of muscles of the upper arm appear before the child is capable of precise voluntary movements of the fingers such as are involved in picking up a marble with the thumb and forefinger.

It may be pointed out, incidentally, that these principles have a bearing on practical rules which, in the past, have been accepted more or less widely in education. The rule that training in motor skill should proceed from gross to more refined movements, from performances that involve "large muscle groups" to performances that involve "smaller" muscles, is substantially in keeping with the proximo-distal direction of development. However, when we take account also of the cephalo-caudal direction of development, it can be seen that it would be a mistake to make a blanket rule that, up to a certain age or stage of development, activities involving "big muscles" should be the only ones included in the educational program. As a matter of fact, a child may be capable of, and quite interested in, quite delicate coordination in the use of his hands and fingers (as in manipulating a small object with his thumb

and forefinger) while he yet is unable to make relatively gross coordinations involving the lower limbs (such as propelling a tricycle).

LEARNING AND GROWTH

The development of behavior is influenced both by the factor of growth and the factor of learning. The most obvious evidence of growth appears in the increase in the child's height and weight as he grows older. Evidence of learning can be observed whenever a child's behavior has been modified by virtue of past experience.

In connection with many aspects of development it is possible to make a pretty clear distinction between these two factors. Thus, a child does not *learn* to grow bigger: he just grows, so to speak, although his growth may indirectly be influenced by learned forms of behavior (such as bad food habits) and by factors in his environment (such as the lack of a good diet). Again, when a child at three years speaks English rather than French it is obvious that the language he speaks has not grown but has been *learned*.

In the development of behavior, the factors of growth and of learning usually are so closely interrelated that it is not possible clearly to distinguish one from the other. In the case of many features of behavior it is possible, however, to make a rough practical distinction. This distinction is very significant in connection with the many habits and skills which a child is called upon to learn in the course of his education. It is learning that accounts for the fact that the child in the example above speaks English rather than French, but the fact that he is now capable of learning any language, whereas earlier he could not, is influenced by the factor of growth. For the sake of efficiency and comfort the child's education should be in keeping with his own growth.

As a homely example, we may note one rather important feature in the child's early curriculum, namely, the "training" he receives in bladder control. Some mothers begin this training as early as the third month in the hope of establishing the

"dry habit" before the child is a year old. However, until the child has reached a level of neural maturation at which he is capable of voluntary *control*, the "learning" that takes place consists largely in his mother's learning to anticipate when the child is likely to void his bladder. To the extent that this holds true, the "dry habit" is not the child's but the mother's.

Concerning the role of maturation in determining the child's readiness to acquire bladder control there is evidence both from neurological investigation¹² and from a study of overt behavior. The part of the cerebral cortex that governs bladder control is not capable of functioning during the first few months of life. In a study by McGraw,¹³ records were made of the eliminative behavior of infants during a period of several months. The records indicated that there were distinct phases in the attainment of bladder control, and these phases were not altered in two children who received systematic "training." However, the infants began to respond actively to training when it appeared, from various signs in the children's overt behavior (such as signs that he was aware of the act of elimination, of his role in the act, of the tinkling sound, of puddles and the fact that he was the one who could make them), that the cerebral cortex was working in relation to this function. The age at which these evidences of neural maturation appeared varied in the babies included in the study. But when once a child has reached the level of maturity, at which he can begin to exercise control, "training" is likely to take effect, whereas earlier it did not.

The Role of Maturation Plus Incidental Activity. Since our knowledge of the development of the cerebral cortex in relation to the development of various abilities and performances is not complete, most of our information as to the effects of maturation, as distinguished from exercise, practice, or training, has come through observation of behavior or from experimentation, without direct evidence regarding changes in the nervous system. One generalization that emerges from such observation is that the establishment of basic coordinations involved in the development of locomotion, and the use of the

arms, hands, and fingers in reaching, grasping, and manipulation, depends primarily upon the factor of maturation plus such incidental "practice" as the child undertakes on his own accord. Another generalization is that once the groundwork has been laid, through the process of growth, opportunities for learning play an important role in determining the number of different skills that will be acquired.

Let us consider first the influence of maturation and incidental "practice." In one study it was observed that there was little that mothers could do by way of coaching or encouragement to alter the sequence or rate of the developments leading up to the child's ability to walk alone.¹⁴ Further evidence concerning this point is provided in a study of the development of twin sisters, one of whom for a period of six weeks, beginning at the age of forty-six weeks, received special encouragement and opportunity to climb stairs and to handle blocks. At the end of this period it was found that the twins were substantially similar in their manner of handling the blocks. Likewise, the child who had not had access to the stairs speedily proceeded to climb the stairs unaided and soon did as well as the youngster who had had a chance to "practice" stair-climbing during the six preceding weeks.¹⁵

Findings such as these do not, of course, mean that the performances in question simply "grow" without benefit of experience. Even when he is restricted more than normally, or is denied coaching or encouragement, the child will be more or less active of his own accord. But from a psychological as well as educational point of view there is a great difference between such spontaneous practice and arbitrary drills, or lessons and assignments imposed upon the child by someone else.

The Role of Growth and Training in the Development of Skills. Let us consider now the second generalization mentioned above, namely, that opportunities for learning become important in deciding whether or not the child will learn specific skills which he now has a capacity to learn by virtue of the process of growth. As indicated above, special coaching

does not seem to hasten the development of the bodily mechanics involved in walking. However, to master special skills that involve locomotion, such as roller-skating, or propelling a scooter, requires special equipment and a chance to practice. Similarly, special provisions for learning will not materially accelerate the development of a child's capacity to oppose thumb and forefinger in a pincerlike manner. But in order to adapt this form of prehension to skill in using a pair of scissors, or in buttoning, or in handling the shooter in a game of marbles, he again needs special equipment and practice. Granted the necessary equipment and opportunity, accordingly, one child at a given age may be proficient in all of these performances, while another, whose earlier progress in locomotion and prehension was quite similar, is not.

Different Performances are "Ready" for Practice at Different Times. The level of maturity at which the child will be interested and be able to profit from opportunities to learn such performances varies, however, with different performances. Thus, in one study¹⁶ it was found that a child was able to learn to roller-skate almost as soon as he was able to walk, but it was not until several months later that he was able to make any progress in riding a tricycle. Likewise, the time when a child can profit from practice varies also in connection with manual skills. In a study by Hilgard,¹⁷ two-year-olds were encouraged to learn how to manipulate buttons and how to cut with scissors. At the end of a twelve-week period of "training," the trained children were superior to the children who had received no such help. During the thirteenth week, the latter group also received training. They made comparatively rapid progress, and at the end of this one week of practice they were almost as proficient as the children who had practiced the performances during the preceding twelve weeks.

Maturation plays an important part in the development of increased speed and precision in a child's movements, and in the development of increased muscular strength.^{18, 19, 20} If a performance depends primarily on either of these factors then early practice has limited and often doubtful value.

The Nature of What is Learned Depends on Stage of Growth. The effects of training or of opportunities for learning are influenced by the child's stage or phase of growth. As one feature of a larger study, one of a pair of twins received training in climbing an inclined board.²¹ He made quite remarkable progress, but his proficiency in climbing did not alter the underlying pattern of his mode of locomotion. When the climbing exercises began, he was able to creep but not able to walk, and so he used the *creeping* pattern. His proficiency in climbing consisted in doing a better job of creeping up (involving the use of the toes to grip and push). In time, he progressed from creeping to walking as his normal means of locomotion, and when this occurred, his climbing pattern also changed: he now had to depend more upon his arms in pulling himself upward than upon his toes in gripping and pushing himself upward. The training he had received during the creeping phase did not carry over completely to the walking phase, although the child readjusted to the change, and as the experiment went on continued to show an unusually high degree of proficiency in climbing.

Need for Readaptation of Skills to Changes Occurring in the Process of Growth. What is learned at a given level of development is not necessarily carried over intact to a later level if there have been intervening changes in the underlying bodily structures and in the mechanics of the movements that are involved. The need for readapting a skill to changed bodily proportions is shown in connection with a performance acquired by a child in the experiment with roller-skating cited above. The boy who roller-skated very competently at the age of two was not good at roller-skating at the age of six. In the meantime, he had not practiced the performance. It appeared that without intervening practice a skill that was acquired in relation to the bodily proportions of a two-year-old, including relatively short legs and a wide stance, did not carry over to the bodily proportions of a six-year-old, with longer legs and a relatively narrower stance.²² In everyday life one can observe many situations analogous to this. The child whose gait was

smooth and graceful at ten may become awkward for a time when the growth spurt of adolescence changes his bodily proportions (including an increase in the size of his feet and in the length of his legs). He needs practice in using his changed dimensions before he again falls into an easy stride.

The fact that such readjustments through continued or renewed practice are required does not necessarily mean, however, that practice at an earlier phase of growth is wasted. The changes that occur in the mechanics of a performance are not likely to be so complete that there can be no carry-over at all from one period of development to the next. Indeed (although there is not much systematic evidence on this point) it is likely that the maximum proficiency will be achieved in many performances only if they are practiced from the time when the child is able to undertake them at all. The value of such practice is illustrated by the outstanding achievements of occasional individuals who began training in an activity such as skating at an early age and continued their efforts into adult years. Moreover, continuing practice, adapted to the individual's capacity at various levels of growth, not only seems to be helpful in perfecting a skill but also in influencing the individual's attitude toward the use of the skill. A child who has had the experience of climbing successfully is likely to continue to be more intrepid and self-confident in his reaction to heights as he continues to practice, even though there are some shifts in the manner of his climbing as he matures. Conversely, an individual who first undertakes a performance at a late stage of growth may meet difficulties that might have been avoided by earlier training. For example, a person who is just beginning at the age of twenty to learn to skate will find it harder to "let himself go" than would have been the case at the age of six or eight.

In line with the foregoing, it may also be noted that modes of behavior that are appropriate to a given level of development are not necessary "habit forming" in the sense that they will block other modes of performance at a later level of development. There are distinct changes, for example, in the man-

ner in which a child throws a ball as he grows older. The practice which he has had in throwing in an "overhand" manner does not prevent him from learning other ways of throwing (unless, perhaps, the earlier mode of throwing is continued well beyond the time when he is capable of making the change).

Both Growth and Learning Take Time. This heading expresses a simple truth, yet it is a truth that often is overlooked in everyday dealings with children. In the foregoing we have noted that a child is "ready" for different performances at different times. It should also be noted that once a child is "ready" for a certain performance it may still take much time and practice before the performance is well established and functions smoothly. After a child has begun to walk, for example, he still needs much practice before the act is refined and well under control. It takes time to learn to adapt to footing that goes up or down hill, to negotiate small obstructions without tripping, to round a corner, to buck the wind, to maintain good balance when walking with and without shoes, and so on. The same holds true in connection with other operations. Even to do what comes naturally takes practice. Moreover, many operations that seem almost automatic may have to be re-adapted and, to a degree, relearned, as changes in the organism occur in the process of growth. Even so habitual a performance as walking may become stilted and labored for a time, as noted above, while the adolescent youngster is growing rapidly in height, leg length, and foot size.

MATURATION AND TRAINING IN RELATION TO MENTAL ACTIVITIES

Findings concerning the role of maturation and such practice as a child undertakes on his own accord, as distinguished from special opportunities for exercise or learning in connection with intellectual performances, show many parallels with the findings in studies of motor development, but the studies conducted to date have been rather limited.

The Age for Effective Training. A child's ability to profit from training or exercise in a great variety of intellectual performances is likely to improve as he grows more mature. In the case of many performances a short period of training at a later age will yield as high a degree of proficiency as a longer period of training at an earlier age. This has been noted, for example, in studies in which training or exercises have been provided with a view to increasing children's competence in the use of language,²³ their memory span,²⁴ their speed of naming colors,²⁵ their ability to solve arithmetical problems,²⁶ and their understanding of concepts of time.²⁷ In many of these studies, it should also be noted, the children who received earlier training did improve and were somewhat superior to matched control subjects at the end of the experimental period, even though the cost in time and effort was high. It is possible that if the training were continued for considerably longer periods in one group, and were correspondingly deferred in the other, the former might eventually reach a degree of competence that the latter would not later be able to equal. But to spend many months in learning at an immature level what can be learned in a few weeks at a more mature level is an expensive way of doing things. This is all the more true when we realize there is so much else that might be learned if an untimely assignment were postponed to a later season.

Variable Effects of Training at Different Levels of Maturity. The foregoing statements have emphasized the fact that a child's readiness to profit from training or opportunities for learning at any given period varies in the case of different performances. This generalization is quite obvious when considered in the light of widely separated intervals (no one, for example, would try to teach a one-year-old child how to play bridge), but it raises many questions when considered in terms of the range of skills that might be appropriate at a given level of maturity. Findings in studies in which special opportunities for practice have been provided, or in which work traditionally prescribed at one grade level has been deferred until a later time, suggest that the educational program might be de-

cidedly improved if more account were taken of the factor of maturation in the development of the mental abilities of normal children.

One such study dealt with the development of children's understanding of chronology and concepts of historical time. It was found that sixth-grade children who received formal training in history, supplemented by various devices, such as time lines and time charts, did not, at the beginning of the seventh grade, differ appreciably in their mastery of concepts of time from another group of children who had not received any formal instruction.²⁷ In the process of growing older, and of acquiring such information as might be acquired incidentally in their everyday experiences, the youngsters who received no special instruction made as large a gain on tests of time concepts as did the former. In another study, comparisons were made between pupils whose formal instruction in arithmetic was postponed until the sixth grade and pupils who were taught according to the conventional course of study.²⁶ It is reported that when the former children finally were introduced to the more formal (as distinguished from everyday and incidental) arithmetic, they mastered, in a relatively short time, arithmetical problems that pupils in the usual classrooms had struggled with for a relatively long period of time in the earlier grades. On the other hand, some studies have shown that a child's ability to profit from teaching in other areas may quite surpass expectations. This has been noted, for example, in studies of the response of young children to training in singing.²⁸

Studies such as these are too limited to provide a roster of performances that may most appropriately be selected for emphasis at any given period. They suggest a need for more comprehensive investigations.

SOME GENERAL CHARACTERISTICS OF

THE DEVELOPMENT OF BEHAVIOR

In the discussion so far we have noted the nature of some of the changes in behavior that take place as a child matures and

some factors related to these changes. In addition, it is possible to note certain other general trends or characteristics in the development of behavior. Some of these are discussed immediately below. Others will be touched upon in later sections that deal with various aspects of motor, mental, and social development. The statements that follow should be regarded as broad descriptive formulations rather than as laws or principles that invariably hold true.²⁹

Uniformity of the Sequence of Development in the Establishment of Basic Behavior Patterns. Although children differ in their rate of progress and in their accomplishments at any given time, they show a high degree of similarity in the order in which different developments appear and are consolidated. This can be noted, for example, in the development of the basic coordinations underlying the ability to walk and in the succession of developments that eventuate in the ability to talk.

Perhaps the most notable illustration of uniformity in the succession of behavior changes in early life is provided by premature children. Such children must carry out operations that normally would not be required for some time, such as breathing and obtaining nourishment through the digestive tract. But in some features of their behavior—their reflexes, postural attitude, and muscular tonus—they continue after birth to show many characteristics of the prenatal period of growth. They do not, by virtue of being born prematurely, suddenly “skip” a month or two or more in their development.

Interrelation between Different Aspects of Development. The interrelatedness of developments in different aspects of a child's make-up is especially prominent during early childhood. It is difficult to make a clear distinction between what might be called “mental” as distinguished from “motor” behavior during early infancy. Likewise, the child's early *social* behavior is closely bound up with his *mental* development. For example, when the child some time during the first two months or so responds by smiling when he sees another person, he shows an advance in his social behavior, but, to the extent that his response involves ability to discriminate people from other

objects, it also represents an advance in his mental development.

A good illustration of the manner in which various aspects of behavior are interrelated appears in forms of shyness that some infants show at about the age of seven months (sometimes later, sometimes earlier) in response to an unfamiliar person. This response denotes a degree of *mental* development (discrimination between familiar and unfamiliar persons); it also is a response to another person, and so may be called a *social* reaction; and it also is an *emotional* response in that it sometimes involves evidences of fear.

The impact of developments in one sphere upon other aspects of behavior is also illustrated by walking. The *motor* ability to walk aids *intellectual* development by enabling the child to explore his environment. Walking also influences *social* behavior by widening the range and variety of a child's contacts with other people; it influences also his *emotional* behavior in numberless ways by enabling him to get into contact with or to escape from conditions that may lead to pleasure or anger or fear.

Such interrelationships continue throughout life, but with the passage of time many forms of behavior that at first were closely interwoven become relatively more independent and channelized in the form of habits and skills in one sphere that bear little obvious relation to performance in other spheres.

Spontaneous Activity as a Feature of Growing Ability. The young child's spontaneous activities parallel and are an integral feature of his growing abilities. As his powers increase he is on the job to use them. On his own accord, he exercises his eye coordination and his sensory equipment. In his own good time he tries to raise his head and chest, to hitch and propel himself forward, to crawl, creep, and walk. In his language development he shows an outpouring of verbalizations, and in his own way he practices and drills. Within the limits of his restricted concentration span, he will perform acts over and over again, and, once he has gained some mastery, he will proceed to use them in more complex ways.

The child's spontaneous activities parallel the maturation of his abilities. In the young child, there is a close relation between what he can do and what he does of his own accord. With the development of any form of ability, there goes an impulse to use that ability.

Throughout later years, interests and abilities continue to be closely associated, but as the child grows older and becomes capable of a larger range of activities his occupations tend to become increasingly a choice between several that might have been undertaken. They also become influenced by customs, the opportunities that happen to be available, and the demands of his elders. Moreover, a child's spontaneous performance in one area may be disrupted by complications from other areas, as when a child has the ability to sing but refuses to do so by reason of shyness or resistance to frequent urging. Generally speaking, the interests of the moment shown by an older child do not reflect his potential interests to the same extent as was true when he was younger. Information concerning a child's abilities often gives a better clue to the interests that he can acquire than do the interests he happens to display.

The principle that development includes an impulse or drive to put growing abilities to use is important for education. It is of the nature of the child to seek experiences that will lead to learning. The child tries to manipulate, to discover. Even in his cradle he is curious and eager to explore. He actively seeks to establish social contacts with other persons. When only a few months old he begins the job of fashioning his physical abilities into countless motor skills.

An integral feature of development is this strong current of *positive* motivation, a reaching out rather than simply a trying to get away from, a striving toward rather than simply an effort to obtain riddance or relief.

From the beginning also, to be sure, motives of a *negative* sort come into play as the child meets thwarting, frustration, and restraint, is deprived of what he wants, is threatened with loss of what he has, or is pushed into doing what he does not want to do. In due time, also, he is likely to experience *conflict*.

ing motives by virtue of desires that are incompatible with each other or are opposed by inhibitions that he has acquired. Thwarting, threats, and conflict are inevitable features of life. However, the more a child's rearing at home and his education at school can be geared to his growing capacities, the more will his training be timed in accordance with his own positive drives and the less necessary will it be to push him about.

Anticipation as a Feature of Growing Ability. At all stages of growth, the developments that are taking place and the behavior that a child displays serve not only the present but also are a preparation for the future. The child's actions at each level of maturity, including actions that are trying to his elders, become easier to understand when viewed in the total perspective of development.

This phenomenon of anticipation appears in many forms. There are many operations a child can perform before there normally would be a need for them: a child born before full term is able to breathe, suck, digest food, and eliminate waste even though normally these operations would not be called for until he was older. This phenomenon also appears in the fact that many forms of behavior that will emerge in time and will displace earlier forms are likely to put in their appearance in advance of the time when they normally will be in full use. The child shows "biting" and chewing movements, for example, while he is still sucking, and even before he has any teeth.

Again, much of a child's behavior during infancy and early childhood is part of a process which will not reach its climax or full expression until many years in the future. The onset of sex behavior appears in infancy, many years in advance of the time when the adolescent is sexually "mature." Similarly, the young person's striving for independence, for pulling his own load and making his own decisions, which reaches its climax late in adolescence, has its beginning in early months of life when the child first begins to assert himself.

The behavior of a child at any maturity level becomes easier to understand if one realizes that forces within the child are pointed toward the future and that behavior that seems un-

timely or awkward or perverse actually may be a herald, long in advance, of a form of conduct that is yet to be.

Reversion as a Feature of Child Behavior. In the course of a child's progress, he frequently reaches the threshold of a new achievement, and then reverts for a time to an earlier level of performance. Such irregularities may appear, for example, when an infant, fed according to his own demands, is making the transition, say, from six to five feedings a day. Again, one fine day he may for the first time walk without support and then for several days fail to do so again, but revert to creeping. Such lapses are likely to appear while the new performance is not completely consolidated.

Analogous lapses sometimes occur in connection with an individual's later learning: he may, for example, pedal several yards on a bicycle and then slump for a time. Sometimes such reversions also appear at a time when activities that have developed more or less independently temporarily interfere with one another before they are completely integrated.

Sometimes, also, a child will fall back upon an earlier and more secure type of performance when he makes new ventures in other performances. While yet somewhat unsteady on his feet, for example, he may creep rather than walk in the process of making social contacts with a visiting child. If frightened he may shift from walking to creeping.

At any stage of growth, an individual may likewise revert to an earlier form of behavior in moments of stress, although the conditions underlying such shifts are not exactly the same as those that obtain by reason of lack of complete establishment of a new activity. Thus, under severe emotional stress, older children and adults may display uncoordinated and aimless movements similar to those of a helpless infant, or they may revert to earlier behavior, such as bedwetting.

"Whole-Heartedness and Gradation." In connection with many features of his progress, a child for a time may be completely absorbed in a performance that has become usable. Then, as time passes, the response becomes more subdued or less all-absorbing. As described by Hollingworth, the course

may be "... from the unequivocal to the equivocal; from the whole-hearted to the discriminative; from all-or-none reactions to graded response."³⁰ In his first clear rage reactions, for example, a child tends to throw all that he has, by way of voice and bodily movement, into his show of temper. His responses may seem to be quite out of proportion to the provocation, and may involve much diffuse movement that is not aimed at anything or anybody and that has no direct value in removing the offending object. As time passes, his physical expressions of anger tend to become less all-absorbing. With the further passage of time, as pointed out in a later chapter, there is likely to be a further gradation of response, so that on many occasions, when he is angry, the child makes no outburst but resorts to more subtle forms of attack.

Changes analogous to these adjustments can be noted in connection with other features of development. When a child has reached the point at which he first is able to creep, or to walk, or has gained the ability to release an object held in his hand and to throw it, or to say a few words, or to ride a tricycle, or to listen with interest to the radio, or to read or to jump rope, such activities may, for a time, monopolize his energies. Some children, in the first enthusiasm for standing and walking, may demand even to be fed while they are standing or on the go. This tendency to give a hard workout to a newly achieved ability may carry so far that other features of development seem momentarily to be at a standstill.

Older children as well as staid adults also sometimes exhibit such "jags." An adolescent's interest in the opposite sex may, for a period of time, dislodge other interests. An eight-year-old may, for days on end, use every possible device to weave into his speech a newly learned bit of slang or expression that has caught his fancy. A new game or pastime may absorb him almost to the exclusion of all else, and then be relegated to its place among other activities.

The tendency on the part of a child to exercise a new ability, skill, or interest in an extravagant way is not, of course, an invariable phenomenon, but adults who have charge of

children will be wise to recognize it. Frequently, in the rearing of a child, adults are disturbed and interfere when a child thus seems to make excessive use of a new outcropping of behavior when actually the child himself is likely to remedy matters in his own good time. There are, of course, situations in which considerations of safety or of the comfort of other persons will require that adults interfere, but quite often adults are tempted to interfere with harmless preoccupations before they have run their course. In this as in other matters, it would be well if adults could view a child's behavior in the perspective of development and not in terms of adult standards.

Developmental Revision of Habits. In the process of growing up, children from time to time show forms of behavior which they later will change or abandon on their own accord. The education of children would be more pleasant for children and less strenuous for adults if this principle were kept in mind. The child creeps; later he walks. In his early speech he mispronounces many consonants, but later he says "three" instead of "free," "mother," instead of "muvver." The eight-year-old is addicted to certain radio programs which he is likely to deride at the age of fourteen. The ten-year-old boy who wants to keep company only with boys is eager at eighteen for the company of girls.

In his own good time the child changes many of his ways. Behavior that is appropriate for a certain stage of growth is not perpetuated just because it is repeated over and over again. Repetition of behavior that represents the best a child can do at a given level does not necessarily fix it as a habit that will carry over to a later level of maturity.

Development consists not only in the emergence of something new but also in the abandonment of behavior that was suited to the organism for a limited season of its growth. This principle that old forms of behavior are revised or sloughed off in the process of development has important implications for education. Educators, whether in the role of parents at home or teachers at school, should try to fall in with the tempo of the child's own development.

This means that we should not, as a matter of course, try to rub out a form of behavior which represents the best a child can do with what he has at a particular stage of his growth. If a detailed study were made it no doubt would be found that a large proportion of the teaching that goes on both at home and in school consists in efforts to teach today what the child will himself seek to learn tomorrow, and in efforts to get the child to abandon ways of behaving which he, at the proper season, will himself discard. Unfortunately, we need more research to tell how this principle might best be utilized and what its limitations are.

Continuation of Obsolete Forms of Behavior. While it is true, as we have seen, that a child on his own accord revises many of his ways of behaving in the process of development, it is also true that the opposite may occur. Behavior that served a certain demand or condition may persist when it is no longer needed and is no longer appropriate. Many of the fears a child displays are of this character. Having become afraid of a dog when small and defenseless a youngster may continue to be afraid to much the same degree when he is older and able to protect himself. Many forms of anger and hostility, bias and prejudice, dislikes with respect to food, notions about the right or the wrong way of doing things, also persist in this manner. The persistence of old ways of behaving may create trouble as a person moves toward adult years, especially if he is blind to the fact that he now behaves in a way that might have been well suited to an earlier occasion but is now inappropriate. Such would be the case, for example, if he unthinkingly carries over into his dealings with friendly people a tendency to be distrustful and on the defensive which he acquired at a time when he actually was exposed to abusive children or adults.

SUMMARY

The child at birth exhibits a wide range of behavior which has a history extending back into the prenatal period of growth. Although the child at birth is capable of the processes necessary for maintaining life and is able to exhibit a wide array of move-

ments, his behavior shows many characteristics that will undergo radical changes in time. Much of his behavior is diffuse and seemingly unorganized. Some of his actions betray the fact that the higher brain centers are not functionally mature at birth.

Certain general trends can be noted in the changes that take place after birth. Generalized activity gives way to more specialized activity. New performances are individuated out of previously more inclusive reactions. With the passage of time, also, operations that have become differentiated out of previously more generalized activity are organized and recombined into skills of various kinds.

Development tends to take place in a cephalo-caudal direction—from the head tailward. Development also tends to proceed in a proximo-distal direction—from the main axis of the body toward the extremities. Examples of these directional trends can be seen in the fact that the child is capable of considerable coordinated movement of the arms while yet he has relatively little control over his legs, and that gross movements involving the arms precede coordinated and precise movements of the fingers.

In the process of development two interrelated factors are at work: learning and maturation. Experiences that provide a basis for learning are necessary for normal development, but exercise or training alone cannot produce the changes in capacity and performance that normally occur in the process of growth. In the training of children it is important to take account of the factor of maturation and to adjust requirements and opportunities for learning to the child's readiness. As has been pointed out in the preceding pages, efforts to accelerate a performance by means of coaching or special training are not likely to be effective if the child, by reason of his immaturity, does not have the equipment to profit from such training.

Many of the basic coordinations involved in the use of the limbs appear to depend primarily upon the factor of maturation plus such incidental practice as the child undertakes on his own accord. On the other hand, the effects of opportunities

for learning become important in determining the child's acquisition of specialized skills that involve these coordinations. The level of maturity at which a child will be able to profit from opportunities to learn varies in the case of different performances. Further, the effects of training or of special opportunities for learning will be relative to a child's stage or phase of growth.

In connection with many activities a child's ability to profit from training improves as he grows more mature so that in some performances a short period of training at a later age will yield as high a degree of proficiency as a longer period of training at an earlier age. Since, in the education of children, there usually is a wide range of choice as to learning opportunities that are provided at a given time, this principle has much educational significance. Available findings suggest that in some features of the academic education of children (notably in connection with mastery of abstract concepts in the social studies and perhaps also in the field of arithmetic) children have been compelled to grapple with units of subject matter that might be learned more efficiently at a later age. On the other hand, in the field of motor skills, manual crafts, and certain features of musical activity, the educational opportunities usually provided for children do not appear to have been commensurate with children's potentialities or their capacities for mastery and enjoyment of a wide range of skills.

In the development of behavior from infancy onward certain general characteristics can be noted. Although infants differ in their rate of progress and in their accomplishments at any given time, they show a high degree of similarity in the order in which different developments appear and are consolidated.

The child's spontaneous activities parallel and are an integral feature of his growing abilities. This holds true especially during the early years. As a child grows older the operation of this principle becomes less apparent, since with added age a child becomes capable of a larger range of activities and the occupations he himself chooses tend to become increasingly a

choice between several that might be undertaken. They also are increasingly influenced by prevailing customs, the opportunities that happen to be available, and the demands of his elders.

In the course of a child's progress he frequently reaches a new achievement or mode of behavior and then reverts for a time to an earlier level of performance. In connection with many features of his progress a child for a time will seemingly overdo or exaggerate or be completely absorbed in a performance, and then as time passes, his whole-hearted absorption in the project subsides. Frequently in the rearing of a child, adults are disturbed by this tendency and take steps to interfere when a child thus seems to make excessive use of a given form of behavior; although actually, in many circumstances in which this absorption occurs, the child himself is likely in his own good time to remedy matters.

In the course of development the child shows many forms of behavior which he himself revises as he matures. The fact that a child does a particular act over and over at a certain level of maturity does not necessarily mean that he is establishing a habit that will cleave to him forever. At one stage in the development of locomotion, for example, he creeps, day after day, but this does not bar him from learning how to walk at a later stage.

While development thus involves a good deal of revising of earlier ways of behaving it also sometimes happens that behavior that has occurred in response to a certain demand or problem may persist when it is no longer suitable. Fear that arose when a child was weak and defenseless may continue after he has become stronger and able to protect himself. Dependence on others may persist beyond the time when he is able to take care of himself. A way of behaving which thus is out of date may make trouble if the youngster, as he grows older, fails to recognize it and succeeds rather in rationalizing it to himself.

QUESTIONS AND EXERCISES

1. List examples from your own experience or from your observations of others of the phenomenon of "wholeheartedness and gradation."
2. On the basis of your own experience as a pupil or teacher, or your observation of others, can you describe any school subject or assignment that seemed to be very difficult when first encountered and then seemed to be "easy" when you tried it again after the lapse of some time without intervening practice? To what extent do you think the change in ability might be due to (a) maturation? (b) incidental practice? (c) intervening learning that did not bear directly upon the project in question but still proved to be helpful?
3. What are some of the educational implications of the statements set forth in the section dealing with the topic of spontaneous use (or interest) as a feature of growing ability?
4. On the basis of your own experience or observation, what changes, if any, would you advocate in the "grade placement" of the various subjects or topics that conventionally have been taught at some time or other during the elementary school period? (For example, does your own information or experience bear out the findings cited in this chapter with respect to processes involved in arithmetic, or concepts in the general area of the social studies, or with respect to other matters you were called upon to learn before you were "ready"?)
5. Can you think of any skills which you now wish you possessed and which, in your judgment, might well have been taught in place of some of the things you were required to learn during childhood?
6. Suggest an experiment to provide information as to the age or grade level at which long division might best be taught. What are some of the complications that would be met in such an experiment?
7. Consider the steps one goes through, and the nature of the progress that takes place, in learning a new performance (such as tennis, basketball, knitting, driving a car). In what ways does such an enterprise in its early stages resemble the developmental progress of the young child as described in this chapter? What are some of the differences?

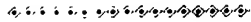
8. In what respects would a blanket rule to the effect that, in the education of young children, use should be made only of activities that involve "gross coordinations" or "large muscle groups" be out of keeping with the "direction" of development as described early in this chapter?
9. Think of illustrations from your own observation or from your own experience of the principle of developmental revision of habits—the principle that when a child, at a certain level of his development, performs an act over and over again, he is not thereby necessarily fixing a habit which will carry over to a later level of maturity.
10. Try to think of illustrations from your own observation or experience of the fact that ways of behaving, which might have been quite appropriate when they first occurred, sometimes persist and make trouble later when the individual has reached a level of maturity at which such behavior is not appropriate, or does not represent the best he can do.

GENERAL REFERENCES

- Carmichael, L. (editor), *Manual of Child Psychology*, John Wiley and Sons, 1916. See notably Ch. II, "The Onset and Early Development of Behavior," by Leonard Carmichael; Ch. III, "Animal Infancy," by Ruth M. Cruikshank; Ch. IV, "The Neonate," by Karl C. Pratt; Ch. VI, "The Ontogenesis of Infant Behavior," by Arnold Gesell; Ch. VII, "Maturation of Behavior," by Myrtle B. McGraw.
- Gesell, A., and H. Thompson, *Infant Behavior*, McGraw-Hill Book Co., 1934. An account of sequences in development during early years.
- McGraw, M. B., *Growth: A Study of Johnny and Jimmy*, Appleton-Century Co., 1935. Deals mainly with twins (one of whom received early training in a number of activities) but also describes the development of behavior as revealed by study of a larger number of children.
- The Thirty-Eighth Yearbook of the National Society for the Study of Education*, Part I: *Child Development and the Curriculum*, Bloomington, Ill., Public School Publishing Company, 1939. Discusses the development of children's abilities and characteristics in relation to educational policies and practices.



CHAPTER III



PHYSICAL AND MOTOR DEVELOPMENT

Physical development and motor development are important both from the point of view of physical well-being and from the point of view of behavior and adjustment, but only the latter aspect of the subject will be treated here.

GROWTH IN HEIGHT AND WEIGHT AND BODILY PROPORTIONS

Most noticeable in the physical growth of children is their increase in height and weight, but quite as important in their influence on behavior are the changes with age in bodily proportions and the varying rates of growth of different parts and organs of the body.

The rate of physical growth tends to be most rapid at the beginning of life and then to taper off as the child nears maturity. An exception to this appears in adolescents when some organs of the body grow rapidly and when many children show a spurt in rate of growth in height and weight. Even during this spurt, however, the gains are small, relatively, as compared with gains early in life. During prenatal life the infant increases in height from practically zero to an average of about 20.5 inches at the time of birth. The rate of increase thereafter continues to be rapid during the first two years of life, after which the rate is comparatively slower. By the age of five years, the average boy has increased from about 20.5 inches to about 42 inches, and there is a further increase to about 68.5 inches by the time he reaches his maximum at approximately seventeen or eighteen years.

The Bearing of Physical Factors on Behavior. As suggested above, children's physical characteristics have an important influence on their behavior. We shall note some such influences

here, and others at a later point in this chapter. Most important, perhaps, is the effect an individual's bodily dimensions and physical strength have on his concept of himself and the impression he makes upon others. From an early age children reveal an awareness of being little as compared with older folk, and an awareness of being bigger than younger children, or bigger than they once were. This concept of bigness or littleness is to a large extent, although not entirely, influenced by physical size and strength and motor skill.

The extent to which a child regards himself as big or little, in turn, has a bearing upon what he expects of himself. Now that he is a "big" boy he does not do some things which he would not have hesitated to do earlier. Adults play heavily on this theme as a means of getting the child to conform.

A child's size also materially influences the standards others hold for him. One result is that a child who is small for his age may be babied or helped while the child who is no older and no more "mature," but big for his age, will be expected to take care of himself. The former may be allowed four or five more strikes at baseball, and a shorter distance to first base, while the latter must follow the regular rules. To be big or small may be an advantage in some situations and a disadvantage in others. These psychological consequences of being big or small in physical size have not been well explored.

Varying Patterns of Growth in Stature. Figs. 1, 2, and 3 show that the age at which maximum growth in total height is attained varies with different individuals. There are differences also in the pattern of the growth curve. From Fig. 2, for example, it appears that girls who reach puberty (as indicated by the menarche or first menstruation) at an early age tend for a time to be relatively taller, in comparison with their final stature, than do girls whose menarche comes later.

Although growth patterns vary from child to child, there are certain characteristics that will appear quite uniformly in a large proportion of cases. As indicated in Fig. 3, the slope of the growth curves of girls whose menarche occurs about the same age show a good deal of similarity, whether the girls be

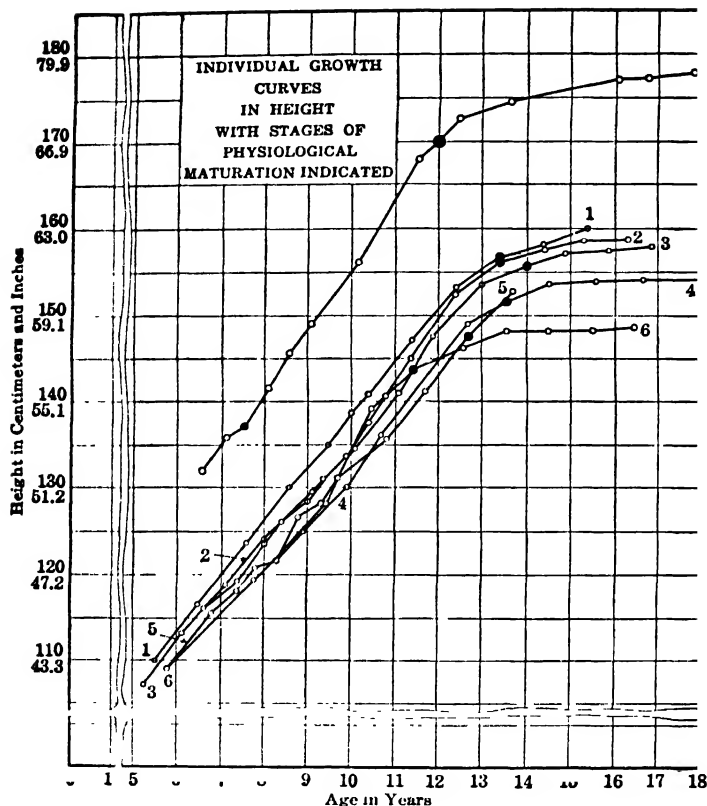


FIG. 1. GROWTH CURVES FOR SEVEN GIRLS.

The curves for the tall girl and for Girl 1 are most regular. These two girls had a history of fine health. The other five girls were subject to illnesses and diseases more numerous and serious than the average. Their curves, especially the curve for 6, show minor irregularities. Even so, these curves show general trends quite clearly. The black circle indicates the beginning of pubescence (From B. T. Baldwin, *The Physical Growth of Children from Birth to Maturity*, University of Iowa Studies in Child Welfare, Vol. I, No. 1)

tall or short. In the case of children whose menarche comes at different ages it may happen that a youngster who happens to "mature" earlier may be taller for a time than another youngster who "matures" later. But in spite of temporary shifts, it is likely that the youngster who is tall or short as a little child

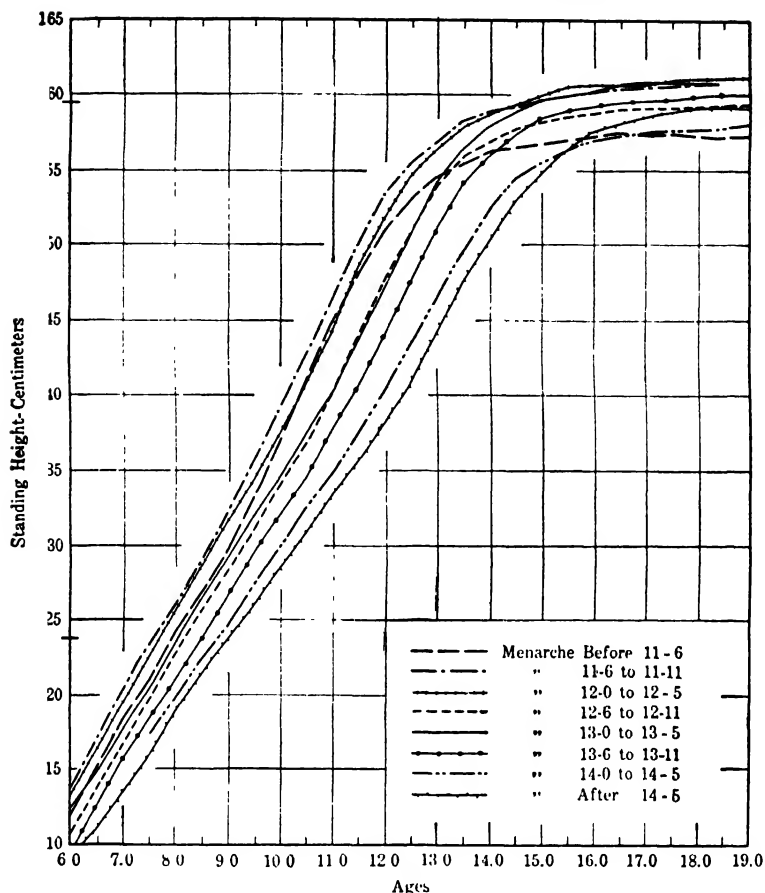


FIG. 2. GROWTH TRENDS IN AVERAGE STANDING HEIGHT FOR EACH OF EIGHT GROUPS OF GIRLS MENSTRUATING AT DIFFERENT AGES.

(From F. K. Shuttleworth, *Sexual Maturation and the Physical Growth of Girls, Age Six to Nineteen*, Monographs of the Society for Research in Child Development, 1937, 2, No. 5)

will also be tall or short when he has reached his maximum growth. The growth pattern varies also in different parts of the body. The increase in the length of the arms and legs, for example, is much greater than the increase in the size of the head.

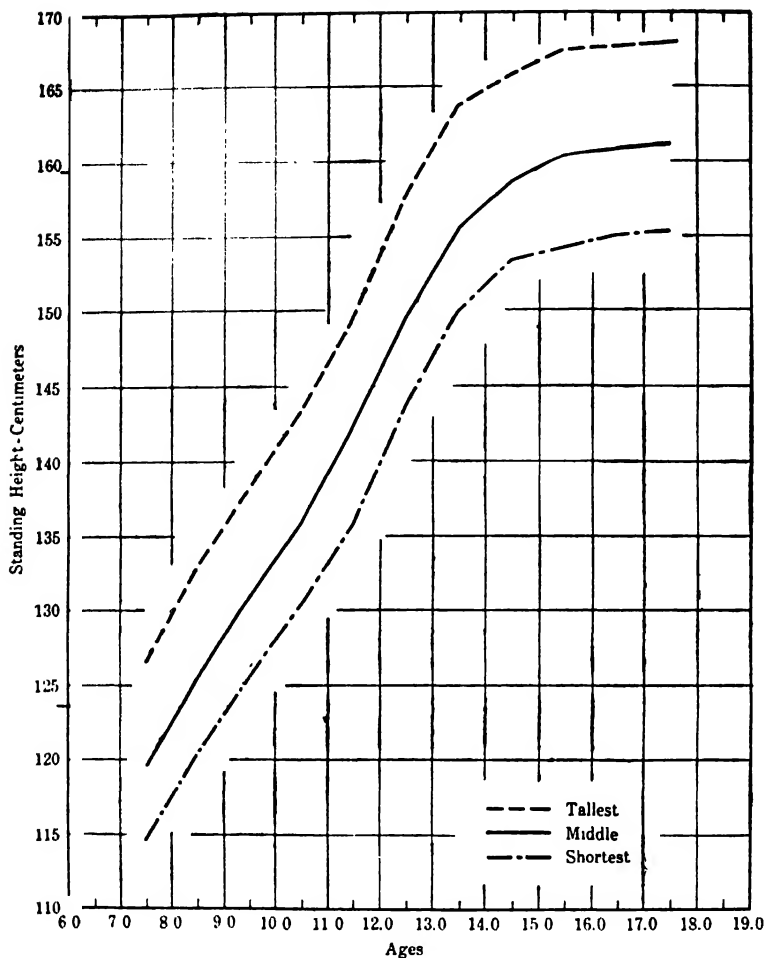


FIG. 3. GROWTH TRENDS IN AVERAGE STANDING HEIGHT OF GIRLS WITH THE SAME MENARCHEAL AGE, 13-0 TO 13-5.

(From F. K. Shuttleworth, *Sexual Maturation and the Physical Growth of Girls, Age Six to Nineteen*, Monographs of the Society for Research in Child Development, 1937, 2, No. 5)

Differences Between Boys and Girls. One very interesting feature about physical growth is that girls during childhood years are in some physical respects "older" or more mature

than boys. This is most noticeable in the fact that the average girl reaches sexual "maturity," as indicated by the first menstruation, about a year and a half before the average boy has reached the equivalent phase of development,* as shown by comparing Tables I and II. In studies with various groups of girls in the United States, it has been found that 50 per cent are likely to reach the menarche by about the age of thirteen

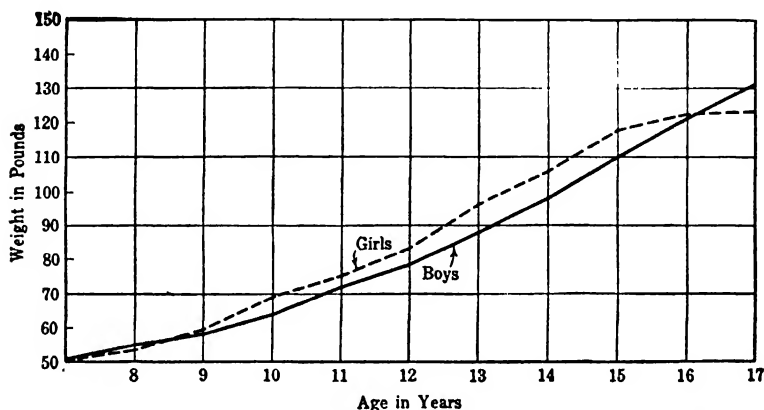


FIG. 4. WEIGHT OF IOWA CITY WHITE BOYS AND GIRLS AGED SEVEN YEARS TO SEVENTEEN YEARS.

(From B. T. Baldwin, *The Principal Growth of Children from Birth to Maturity*, University of Iowa Studies in Child Welfare, Vol. I, No. 1.)

and a half years, while a study of a group of several thousand boys indicates that it is not until approximately the age of fourteen and a half that boys reach the equivalent phase.†

This earlier maturing of girls appears also in other ways. Boys are taller and heavier than girls at maturity but in child-

* "Mature" is here used because its meaning is rather clear even though the term is not at all precise from a scientific point of view. There may be a lag of several months and possibly a year or more between the time that a girl is sexually "mature," as indicated by the menarche, and the time when she is able to conceive.

† The criterion in this study of boys was the appearance of pubic hair that was typically adult in appearance and texture. There is no single feature in the sexual development of boys that is so easy to note as the menarche in girls. This accounts, in part, for the fact that longitudinal studies of physical growth have utilized girls more than boys.

TABLE I*

PERCENTAGE OF GIRLS IN VARIOUS SAMPLINGS OF THE POPULATION WHO REACHED THE MENARCHE AT SUCCESSIVE AGE LEVELS

Chronological Age at Menarche	Brush Foundation	Harvard Growth ^a	Chicago Laboratory School ^b	Hebrew Orphan Asylum ^c	Hebrew ^c	Horace Mann Non-Hebrew ^c
10 yr. to 10 yr. 11 mo	3.5	3.2	1.0	1.1	3.4	3.4
11 yr. to 11 yr. 11 mo	27.5	12.1	7.6	9.7	13.8	12.7
12 yr. to 12 yr. 11 mo	35.0	33.5	23.0	22.7	31.9	31.8
13 yr. to 13 yr. 11 mo	27.0	36.3	35.3	31.9	27.6	30.9
14 yr. to 14 yr. 11 mo	6.0	10.5	25.3	27.0	17.2	12.7
15 yr. to 15 yr. 11 mo	1.0	3.2	6.0	7.6	5.2	6.8
16 yr. to 16 yr. 11 mo	—	0.8	1.6	—	0.9	1.7
17 yr. to 17 yr. 11 mo	—	—	0.2	—	—	—
18 yr. and above	—	0.4	—	—	—	—
Number	200	248	487	185	116	236
Mean (yr.)	12.6	13.0	13.5	13.5	13.1	13.1
Sigma (yr.)	1.1	1.1	1.1	1.1	1.2	1.2

* Shuttleworth, F. K., *Sexual Maturation and the Physical Growth of Girls Age Six to Nineteen*, Monograph of the Society for Research in Child Development, 1937, Vol. 2, No. 5.

^b Abernethy, E. M., Correlations in Physical and Mental Growth, *J. Ed. Psychol.*, 1925, 16: 458-466, 539-546.

^c Boas, F., *Human Biol.*, 1932, 4: 307.

* From Simmons, K., and Greulich, W. W.: Menarcheal age and the height, weight, and skeletal age of girls age 7 to 17 years. *J. of Pediatrics*, 1943, 22, p. 10.

TABLE II*

PERCENTAGE OF BOYS IN THE PUBESCENT STAGE AND ACCUMULATIVE PERCENTAGE OF BOYS WHO HAD REACHED THE STAGE OF PUBERTY AS JUDGED BY THE CRITERION OF DEVELOPMENT OR CHARACTERISTICS OF PUBIC HAIR

<i>Age</i>	<i>Percentage of Boys in the Pubescent Stage</i>	<i>Accumulative Percentage of Boys Who had Reached the Post-pubescent Stage or the Beginning of Puberty</i>
12.25	16	2
12.75	25	6
13.25	26	18
13.75	28	31
14.25	28	46
14.75	24	60
15.25	20	70
15.75	10	85
16.25	4	93
16.75	4	95
17.25	2	98
17.75	0	100

* From Crampton, C. W.: "Physiological Age—a Fundamental Principle," *I. Am. Physical Education Review*, 1908, 13, 141-154.

hood the average girl at a given age, such as the age of eight years, is likely to be heavier in proportion to what she will weigh at the age of eighteen or twenty than is a boy. Again, at the age of about twelve or so, the average girl in a group is likely to be taller in proportion to her ultimate height than the boy.

The more rapid maturing of girls appears quite notably in the development of the skeleton as measured in terms of "skeletal age" (determined by X-ray pictures of parts of the skeleton at different growth levels). "Skeletal age" denotes the extent to which ossification, or change from the soft cartilaginous bone structure of the little child to the hard, brittle bone structure of the adult, has taken place. Children with the same chronological age differ considerably in their "skeletal age." One investigator reports that girls are more advanced than boys in skeletal development at birth. They are about one year ahead of boys at the age of entering elementary school and about two years ahead at the age of entering high school.¹ As

it happens, the onset of puberty is more closely related to a child's "skeletal age" than to his chronological age.*

Psychological Implications of the Differences between Boys and Girls. The fact that girls are, in certain ways, "older" people than boys who have the same birth date, has received a considerable amount of attention in recent years. The scientific findings support and supplement one thing that parents and teachers have noticed in ordinary observation, namely, that girls sometimes show certain kinds of heterosexual interest at an earlier age than boys. In an eighth-grade group, there may be several girls who have their eyes on the boys, while most of the boys are still very boyish, and, from the girls' point of view, rather childish in their interests. Some teachers have noted that this may make a considerable practical difference in the grouping and social behavior of boys and girls. One teacher in an elementary school that included the first eight grades noted, for example, that many girls of the eighth grade would "hang around" after school until the bus from a high school some miles away had arrived, and would "kid" with the high school boys, while their male classmates still continued their boyish play with one another much as they had done before.

This matter of "maturity," however, is rather complicated. Instead of saying that girls "mature" earlier it would be better to say that they advance more rapidly than boys in some ways, but not in others. Kinsey and his associates have found that boys have certain sexual experiences at an earlier age than girls. According to preliminary findings it appears that the female population is twenty-nine years old before it includes as high a percentage of sexually experienced individuals as is found in the male population at the age of fifteen.³ The educational implications of these findings and similar results from other studies are discussed on page 60 and on page 128.

The more rapid maturing of girls is recognized by the cus-

* In passing, it may be noted that information about a growing person's "skeletal age" gives a better indication of how far he has gone toward achieving his adult size than do other factors, such as chronological age.²

tom which decrees that it is more suitable for a girl or young woman to be courted by a male older rather than younger than herself. There is no similar or equivalent allowance for sex differences in the school program and certainly not in the school program during the elementary years, even though, as noted above, the average girl is "older" biologically than the average boy. Whether the school program should make allowance for this fact and what provision, if any, should be made, would require special study. Perhaps it should not make any difference since boys, even though relatively "younger," are still, if anything, physically stronger and bigger.

The difference in physical maturity might be regarded as significant, however, if there also were a difference in emotional and social maturity. The data bearing on this question are rather meager and the problem is complicated by cultural factors. Apart from what might be the natural bent of children, we tolerate certain forms of behavior in girls that are regarded as "immature" if exhibited at the same age by boys (such as crying in public). On the other hand, there are studies which suggest that girls are somewhat more rugged and self-sufficient than boys. In one study of preschool children, Shirley and Poynitz found that boys tended to show more dependence on their mothers than did girls, as manifested by crying and carrying on when left by their mothers in the care of others.⁴ These investigators maintain that since boys are biologically less mature, age for age, than girls, they are more dependent and more in need of maternal care.

PSYCHOLOGICAL EFFECTS OF PHYSICAL CHANGES IN ADOLESCENCE

Because of other concerns, many adolescents are less interested in the academic program than they were in earlier grades. Physically, they are in the process of being converted into young adults. They are also changing psychologically. The striving for independence which began in infancy moves toward its climax. The process of being weaned from parental care is hastened. Forces from within and without are pushing

them nearer and nearer to the powers and responsibilities of adult life.

It takes practice and learning to get used to the changes that come in this process of growth. Even the youngster who is laggard in his lessons at school is perhaps learning lessons in life at a rate that outstrips the rate of academic progress of the brightest student in algebra or English composition. While the developments during adolescence might well be thrilling to the youngster and fascinating to adults who observe him from day to day, the process actually is often painful for the youngster and, instead of being fascinated, his elders are often worried or annoyed by his ways.

Adjustment to Bodily Changes. Of all changes during adolescence, those that occur in the dimensions and properties of the body are most obvious and dramatic. The youngster enters adolescence as a child and leaves as a person able to beget children. He acquires the dimensions and proportions of an adult. The growth spurt that usually heralds the approach of puberty and begins to taper off after the first menstruation in girls and the equivalent phase in boys, may add as much as four or five inches to a youngster's height in one year. In the meantime, the youngster's nose, hands, and feet become much larger. He may gain as much as twenty-five pounds in weight in a single year. It takes time to get used to such changes. Imagine what it would mean if, by a freak, a forty-year-old adult had to adapt to a huge pair of feet, four added inches in height, and bulges and enlargements in various areas of his body. His movements would be awkward for a time. It is likely that he would become self-conscious, especially if he also had pimples, a voracious and much-noticed appetite for food in general and sweets in particular, and a vague uneasiness about whether or when his body and its several parts would stop getting bigger.

The central feature of physical growth is the development of "sexual maturity." We have noted earlier that there are large individual variations in the age of onset of puberty. These differences in sexual development and in other aspects

of physical growth have many social and psychological repercussions. A twelve-year-old seventh-grade youngster may be as mature biologically as many high school pupils of fifteen or sixteen. These differences mean that there is a period in which there is a certain amount of flux and instability in a youngster's concept of himself as measured against group standards. A youngster whose growth spurt comes early may, for a time, grow away from other youngsters who have been about the same size. For a while, even a person who was short may move ahead of a youngster whom he has been accustomed to regarding as taller but whose growth spurt is yet to come. Of course, things stabilize in the end and the youngsters who were tall or short before adolescence tend also to be tall or short, as compared with the group, after the period of growth is over. But in the meantime children have been called upon to make many adaptations. A girl who had grown fast and has become taller than other members of her group might become sensitive about this and slouch and stoop rather than carry herself in a becoming manner, and thus she would aggravate, rather than overcome, whatever disadvantage it might be for a girl to be very tall.

The fact that the average boy is slower in maturing than is the average girl also complicates matters, as noted above.

Heterosexual Interests. There may be a lapse of time between the onset of puberty, as shown by signs described above, and the development of the capacity to reproduce. However, the onset of puberty means that sex interests, which have manifested themselves in one way or another from early infancy, are intensified and become more urgent. The social and economic conditions of modern, civilized life are out of gear with this fact of development. Most young persons have potent sexual urges many months or years in advance of the time when they are able to get a job, to marry, to have a family, and to exercise their sexual urges in a socially sanctioned manner.

While sex becomes a matter of greater interest and urgency with the onset of puberty, it is not something new in the child's life. A large proportion of children during infancy and

preschool and elementary school years show interests and behavior that are sexual in character. By the time children reach adolescence nearly all of them have been interested and curious about sex, and a large proportion of boys and a smaller proportion of girls have had sexual experiences of one sort or another. As a result of augmented interest during adolescence, the percentage of young persons who have sexual experiences increases, so that by the age of eighteen, according to several studies, it is probable that nearly all boys will have masturbated for shorter or longer periods of time; ⁵ and according to one study in a large midwestern city, it is likely that about 40 per cent will have had some form of heterosexual experience once or oftener.⁶ Studies show a smaller incidence of such behavior in girls.

Educational Implications. The fact that young people have sexual urges is recognized by everyone, but schools have done very little to face this fact. In the meantime, young people must deal with a conflict between their own urges and moral and social restraints that have been impressed upon them from early childhood. Education alone cannot solve or resolve this conflict, but much more could be done than has been done to help young people to deal with sexual problems in their own lives, to gain greater insight into their own motives, greater sympathy for others and greater understanding of the responsibilities that sexual functions entail. Moreover, the problems in this area are not restricted to physical aspects of sex. A large number of young people have questions with respect to what is proper, what is expected of them, what is acceptable behavior in social dealings with the opposite sex. Indeed, as everyone knows, there are a great many heterosexual interests and activities that do not immediately or directly involve sex as such, including dating, keeping company, making conversation, seeking out and meeting people of the opposite sex, giving them a second look, and going through what often are lengthy and repeated preliminaries of courtship. The fact that a good deal of practice and learning is involved in this is indicated by statistics which show that the average person, before marriage,

has been in love not once but several times with several different people.⁷

While it is true that adolescents are preoccupied with many things beside the concerns mentioned above, teachers can better understand adolescents and can deal with them more effectively if they recognize and frequently remind themselves of the impact of physical and sexual aspects of development. This is true whether one is a teacher in an area which touches or could touch upon these concerns (such as biology, physical education, or literature) or in an area that is more removed, such as mathematics. Much about the child that seems furtive, rebellious, foolish or thoughtlessly awkward, gauche or clumsy, becomes understandable when one takes these matters into account.

MOTOR DEVELOPMENT

In the pages that follow there will be space to deal with only a few selected aspects of motor development. A child's motor development—his development of strength, speed, and precision in the use of his arms and his legs and other bodily muscles—is a highly important feature in the development of the child as a whole. Motor development is a handmaiden of mental development. The child experiments, manipulates, explores, and gratifies much of his intellectual curiosity by way of motor activities. In like manner, motor behavior serves as a vehicle for a large proportion of the child's social contacts and his learning of ways of cooperating with others. Similarly, motor development also has an important bearing on a child's emotional behavior, since a child's strength, speed, coordination, and skill very often determine whether a child will experience success or failure, and whether he will be thwarted and angry or threatened and afraid.

Motor development is important from an educational point of view not only because of its linkage to other aspects of development but also because of the important role which motor ability sometimes plays in the economy of the personality as a whole. Human abilities are very uneven. A youngster may be intellectually bright, but not notably gifted in his motor ability,

and another child who does not happen to have a high degree of verbal intelligence may stand high above average in his ability to master motor skills, or in the rhythm and ease and poise of his movements, or in his flair for mechanics. On the stage of development, motor activity plays a role that is much more important than the role usually assigned to it in education.

Prehension and Locomotion. The sequence of achievements through which a child moves as he acquires the ability to reach, grasp, and manipulate an object with his fingers or the ability to walk alone illustrate many important characteristics of development. The ability to reach out and later hold a small object, to pick it up and manipulate it between thumb and forefinger, represents an important milestone in motor development. The story back of this development is a long and involved one showing progress from gross and uncoordinated movements with the arms, the development of independent movements of arm and hand, the development of eye-hand coordination, progress from an awkward and poorly aimed approach and from a "scooping" or "corralling" method of grasping an object to use of thumb and forefinger in a delicate, pincerlike manner.⁸

Likewise the ability to walk alone, as we have noted earlier, is preceded by a sequence of developments that can be traced back to the first days of life. The postural developments leading to the ability to walk alone tend to progress from the neck and upper extremities to the trunk and lower extremities.⁹ The developments leading to the ability to walk proceed, generally speaking, from the neck down and are in progress long before the child creeps or walks.

Later Developments. In the development of motor skills, there is progress not only from more generalized to more specialized forms of activity, but also from specialized to more inclusive activities that integrate operations which earlier received separate attention. In many performances, children will concentrate for a time on the establishment of a simple level of skill, then move on to a higher level, and at various stages of

their progress, combine such skills with others that were practiced independently. When mastery is achieved, all of these operations, in turn, may be subordinated to a larger project. Development proceeds both from whole to part (as when a gross, poorly coordinated movement is refined) and from parts to larger wholes, as when the act of running (previously practiced alone) is combined with the act of catching (also previously practiced alone) when the child at baseball makes a "running catch."

An indication of this trend is shown in a study of two- to four-year-old children who were repeatedly observed when brought to a room equipped with a number of wheeled toys (wagon, carriage, dump truck, kiddie kar, and tricycle) as well as other articles including certain hurdles or obstacles (an archway and an incline).¹⁰ The children progressed from simple pushing and pulling of the vehicles, in a backing and filling manner, to continuous pushing and pulling, to pushing and pulling over hurdles. Various levels of skill likewise appeared when the children combined the use of the vehicles with other materials. As the children acquired skill in pushing and pulling, propelling, manipulation of parts, and the transportation of materials, they gave less attention to these operations as independent activities, but instead merged them into a larger enterprise, such as a complicated make-believe game.

Skills Involved in Self-Help. Many characteristics of motor development are illustrated by a child's progress in handling the utensils used in eating. In the development of skill in handling table utensils the child exhibits a phenomenon that appears in other features of his motor progress. He bides his time before he will respond to coaching or urging or opportunities to feed himself.¹¹ In his own good time he will demand such opportunities and make a very active attempt to lay hold of the utensils and to use them. Where earlier he showed anger when someone else did not feed him fast enough he may now show anger if another tries to feed him at all.

In the first phases of his efforts to try his own hand at this job, as in other performances, he is likely to be clumsy. Failure

to recognize that such clumsiness is a normal feature of the learning process often leads parents to restrain or reprimand him. In this area of learning, as in others, adults often are tempted to take a moral attitude toward behavior in which no moral issue is involved. When a child, in the process of learning to use a spoon, spills oatmeal on the table, it is not that his morals are bad but that his motor coordination is still imperfect.

In this sphere of development, as in many others, it often is necessary for a child to put up a battle in order to be allowed to try his growing powers. He struggles to do for himself even when he is rather poor at the job. A similar struggle appears also in connection with other routine habits as well as in connection with the child's intellectual growth and his social development. Sometimes in these struggles the child shows more vigor than wisdom, and frequently his elders show more caution than understanding. It is noteworthy, however, that many of the "problems" which parents see in their children have their inception in the child's wholesome impulse to put his growing abilities to use in spite of the embarrassments, hazards, and interferences that such use involves. This struggle, which is apparent at the age of two, three, and four, is usually quite apparent also during adolescent years. People in one generation after another have viewed the behavior of the new crop of young adults with misgiving and ill humor, forgetting that their own behavior, during a similar stage of development, was disconcerting to the previous generation. In dealings with children at all levels of growth, it seems to be very difficult for an adult to realize that he himself also was once a child and that the world, in the meantime, has changed somewhat.

Changes in Speed, Strength, and Accuracy of Movement. Tables III and IV depict changes with age in a number of motor performances. The gains in many of the motor performances in Table IV roughly parallel gains in height as shown in earlier figures.

Sex Differences in Motor Performance. The averages in Tables III and IV bring out the fact that the average boy sur-

TABLE III
AVERAGE SCORES OBTAINED BY FIVE-, SIX-, AND SEVEN-
YEAR-OLD CHILDREN IN VARIOUS MOTOR PERFORMANCES*

Activity and Measure Used in Scoring	Age Groups, Years					
	5		6		7	
	Boys	Girls	Boys	Girls	Boys	Girls
35-yard dash — timed in seconds.	9.30	9.70	8.52	8.84	7.92	8.02
Hop 50 feet without error — timed in seconds.	10.82	10.33	9.20	8.89	8.81	7.59
Baseball throw at target — 10-foot distance — error in inches.	8.87	16.90	5.40	13.17	4.20	8.50
Baseball throw — distance in feet.	23.60	14.50	32.80	17.80	41.40	24.40
Soccer kick — distance in feet	11.50	8.00	18.40	10.10	25.40	15.00
Standing broad jump — dis- tance in inches.	33.70	31.60	39.30	38.00	42.20	41.00
Running broad jump — dis- tance in inches.	34.40	28.60	45.20	40.00	58.80	50.80
Jump and reach — vertical dis- tance in inches.	2.52	2.22	4.02	3.48	4.98	4.28

* Adapted from Jenkins, *A Comparative Study of Motor Achievement of Children*.¹²

passes the average girl in most tests of strength, speed, and in many motor skills. These differences tend to increase as children become older. The differences are more marked in some tests than in others. Needless to say, the differences between individual boys or girls will be larger at any age level than the differences between the average boy and girl.

This superiority of the boys in some motor performances seems to be due both to inborn factors and cultural pressures. From an early age, boys are under more pressure than girls to engage in active, robust, outdoor games, and in activities that involve speed, strength, and athletic skill. However, apart from this cultural factor, there also are physical factors that contribute to the differences in physique that give boys an advantage in the more robust athletic activities. When they reach sexual maturity, girls are smaller in stature than boys, their

TABLE IV
AVERAGE SCORES IN VARIOUS MOTOR PERFORMANCES TESTED AT INTERVALS OF SIX MONTHS*
MEAN SCORES BY CHRONOLOGICAL AGE

	Age in Years							
	12.75		13.25		13.75		14.25	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
50-yard dash (seconds)	7.74	7.97	7.53	7.84	7.35	7.86	7.22	7.88
Jump and reach (inches)	11.1	10.5	12.2	10.0	12.4	10.6	12.9	10.3
Target throw at canvas concentric-circle target with outdoor baseball (maximum score 50)	29.6	23.6	29.8	25.7	29.5	26.3	30.0	27.0
Broad jump (feet and inches)	5'8.6"	5'7.3"	6'0.1"	5'7.8"	6'1.5"	5'7.7"	6'4.8"	5'6.1"
Distance throw (in feet, with 12-ounce playground ball)	105.7	66.5	116.1	70.7	119.3	74.5	123.4	74.7
Brace test (Group of tests) ⁹	12.9	11.5	12.7	11.6	13.2	11.4	13.7	11.5
							129.0	75.5
							14.3	11.7

* From Espenschade. *Motor Performance in Adolescence*, Monographs of the Society for Research in Child Development.¹²

	Age in Years									
	15.25		15.75		16.25		16.75		17.25	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
50-yard dash (seconds)	7.08	7.99	7.01	8.12	6.87	8.30	6.56	—	6.37	—
Jump and reach (inches)	14.2	11.0	15.0	11.5	16.3	11.6	16.3	—	16.9	—
Target throw at canvas concentric-circle target with outdoor baseball (maximum score 50)	30.3	28.1	28.9	27.9	29.3	27.1	—	—	—	—
Broad jump (feet and inches).	7'0.6"	5'4.3"	7'2.7"	5'3.4"	7'4.6"	5'3.1"	7'3.4"	5'2.7"	7'4.5"	—
Distance throw (in feet, with 12-ounce playground ball).	131.4	74.3	138.9	72.9	144.8	72.9	146.9	75.4	148.8	—
Brace test (Group of tests) ⁹ .	14.7	11.9	15.2	11.9	16.1	12.2	16.3	12.4	15.9	—

arms and legs are proportionately shorter, their trunks proportionately larger, and the female femur is attached to the pelvis at an angle that is mechanically disadvantageous.¹⁴

When the same groups of boys and girls are compared by means of repeated tests over a period of time beginning approximately at the adolescent age it has been found that sex differences become more conspicuous as the children become older. In the series of tests represented in Table IV it was found that the ability to perform the motor acts in question reached its maximum at about the age of fourteen years in girls but continued to improve through the seventeenth year in the case of boys. It also was noted that there were wide variations within each group and that the performance of boys changed rapidly from time to time. The differences between the sexes are so outstanding, however, beyond the junior high school age, that there are not many conventional athletic activities in which boys and girls can compete on equal terms, so that "joint participation in physical activities will, except in rare cases, meet only a social need."¹⁵

Differences between boys and girls vary considerably in connection with different performances. In Table IV it can be noted there is a relatively much greater superiority of boys in performances such as the fifty-yard dash and in the distance throw than in accuracy in throwing a baseball at a target. This finding, and others not here cited, indicate that the boys' superiority over girls is likely to be greater in activities that call for brute strength or for speed under load than in operations that call for accuracy and delicate coordination. In performances in which gross strength is not a major factor, the performance of boys as compared with girls is likely to vary with the amount of practice which the members of the two sex groups have had. Thus in one study¹⁶ it was found that boys far surpassed girls in operations such as putting together the pieces of wood which, when assembled, would make a wheelbarrow. Girls, on the other hand, surpassed boys in putting together pieces of cloth which, when assembled, made a dress.

In the foregoing it is noted that both physical as well as

cultural factors contribute to sex differences in motor ability. The fact that girls are more nearly equal to boys or may surpass them in complex activities that do not depend on gross strength has important implications for education. The school has usually fallen in with conventional notions about what boys and girls can and should do, even when these notions are out of keeping with the actual facts of development. In the process the schools have, by and large, used policies that aggravated apparent differences between the sexes rather than capitalized upon abilities that members of both sexes have in common. Schools have, for example, made more provision for football and baseball, in which boys and girls of adolescent age are quite unequal, than for a game such as golf or tennis, which they can enter into on a somewhat more nearly equal footing, or for folk dancing, in which many of the girls might perhaps even surpass the boys.

While it is obviously not the function of the school to break down distinctions between the sexes, it can be said that at the present time the school in common with the community at large is putting a fence around the potentialities of pupils by stereotyped notions as to what boys and girls distinctively are fitted to do.

Interrelations of Motor Abilities. A person who is highly competent in one motor performance (such as handling a ball) is likely to be above rather than below the average in other motor performances (such as jumping), but the relation between competence in various motor activities is so low that one cannot reliably tell from tests of one what a child's competence in another might be.^{17, 18} The relation will be higher in the case of activities that require a certain amount of muscular strength, or that involve similar coordinations (such as activities that similarly call for skill in dodging), than in activities that consist primarily of specialized skills. Furthermore, the relation between strength and speed is low, although positive. Needless to say, there are individuals who excel in a wide variety of motor performances, just as there are others who are extremely uneven in their abilities. It is possible that if similar opportunities and

encouragements were given to all persons, the relationships between competence in motor performances would be higher than those that are found when tests are administered to children of varying backgrounds. Be that as it may, available evidence indicates that an educational program should not be built on a concept of general motor ability, but, rather, on the concept of motor abilities.¹⁷ Moreover, in order to suit the program to the needs and abilities of children it is important to take account also of the fact that the correlation between motor abilities and mental ability is quite low.¹⁸

HANDEDNESS

During the first months of life, children do not show a consistent preference for the use of one hand, but eventually a majority of youngsters conform to adult ways and turn out to be right-handed. The younger the child, the more ambidextrous he is likely to be. Even at later ages, individuals will vary in the degree of their right- or left-handedness.^{20, 21} Many persons who definitely show a preference for one hand use the other for certain performances.

It appears that both anatomical and environmental factors play a part in determining handedness and that the relative influence of these factors varies in different individuals. The fact that the proportion of apparent left-handedness during early childhood is somewhat larger than at a later time, and that a majority of parents, both wittingly and unwittingly, load the environment in favor of right-handedness, suggests that there might be relatively more "southpaws" in the adult population if children were left entirely free to develop in their own way.

Since the child is moving into a predominantly right-handed world steps taken by his elders to encourage right-handedness will be of some advantage to him. However, to interfere with a tendency toward left-handedness may have unfavorable effects, especially when such interference involves compulsion and emotional strain.

MOTOR DEVELOPMENT AND PLAY ACTIVITIES

Changes in motor ability that come with growth play an important role in determining children's play activities, but motor ability is not alone the determining factor. Quite as important are the factors of mental growth and social and emotional maturity.

Changes with Age in Form of Play Activities. Certain general trends can be noted in the manner in which motor performances are adapted to play situations at various age levels. In the young infant, play activities parallel the child's progress in locomotion, prehension, and other motor developments. At a later time, the child's play involves practice of the sort that helps him to gain command of coordinations involved in activities such as running, climbing, jumping, hopping, pushing, pulling, manipulation, and throwing. During early preschool years, the child utilizes his skills in connection with make-believe activities, contacts with his elders (as in "helping" with housekeeping), and play with other children. During the middle and later preschool periods, there is a continuation of new ventures if facilities are available, and a further refinement and elaboration of earlier skills. The child occupies himself, for example, in gaining greater speed and control in riding a tricycle, stunting and the undertaking of added hazards, such as riding along a narrow ledge, or down a steep incline, or climbing to greater heights. If given an opportunity, he can make considerable progress in using a variety of tools and implements such as a hammer, saw, screw driver, hand drill, rake, hoe, and the like. Increasingly at this age a motor activity or combination of activities will be subordinated to a larger enterprise.

By the end of the preschool period, and from then onward, competition often is involved in children's motor activities. For example, when two or more girls are jumping rope they frequently keep count, and boys likewise keep a record of their performance in bouncing and catching a ball as each awaits

his turn. But it is not until well into the elementary school years that organized competitive teamwork is fully established.

In the early school grades, there is a continuation, in a more elaborate way, of the make-believe interests of preschool years, in such games as keeping house and playing cowboy and cops and robbers. Such make-believe elements also appear in some standard games, such as puss-in-the-corner. Although the social organization of the games in the early grades is more complex than at the preschool level, the rules and activities still are such as to permit a good deal of flexibility and individual freedom. In running and dodging games, for example, such as pom-pom-pull-away, there is teamwork of a sort, but the team is loosely organized, and in the actual play it is each child for himself.

In the middle and later elementary grades, organized teamwork, with relatively rigid rules and allocations of the roles of individual players, becomes more prominent. With the coming of adolescence, there is a continuation of some of the organized games of an earlier time, but there also are notable changes. There is an increased interest in activities that involve both sexes. Usually when play between boys and girls appears it consists not so much in the adaptation or revision of current games and sports so that they may be participated in jointly by boys and girls, but rather in the form of relatively new activities such as dancing. It may even consist of the revival of games of an earlier period that provide bodily contact, such as "round" games, chasing, and tussling, or a renewed interest in school or community projects that can serve as a means of bringing the boys and girls together.

Changes with Age in Number of Play Activities. From the time of birth and well into the elementary school years there is a steady expansion in the number of different play activities in which the child engages. But this trend is broken at about the time of puberty, with the result that in late adolescence and at maturity, the average individual is a good deal more sedentary and engages in considerably fewer motor activities than does a younger person. See Table V. Part of this decline consists in the merger of separate activities of an earlier time into

TABLE V
 MEDIAN NUMBER OF DIFFERENT PLAY ACTIVITIES UNDERTAKEN
 BY PERSONS AT DIFFERENT AGES*

<i>Age in Years</i>	<i>Median Number of Activities Reported</i>	
	<i>Boys</i>	<i>Girls</i>
8	40.11	34.44
9	38.45	34.75
10	36.57	34.89
11	32.29	30.65
12	31.40	28.32
13	26.48	26.30
14	25.13	23.85
15	21.59	22.04
16	20.40	19.77
17	20.79	18.33
18	19.39	19.90
19	19.04	18.61
20	18.40	18.59
21	20.29	19.57
22 and up	17.71	16.53

* From Lehman and Witty, *The Psychology of Play Activities*.²²

larger and more complex enterprises.²³ Part of it is brought about by the fact that older persons do not distribute their time over a wide range of activities but tend rather to spend more time on selected activities. A part of the change consists also, however, in the dropping out of motor enterprises that flourished at an earlier time. By reason of inertia, competing interests in the workaday world, lack of facilities and opportunity, a large percentage of adults rarely utilize in their work or recreation numerous motor skills that they acquired during childhood years.

Implications for Education. This high mortality of childhood games has implications for the education of children, for it suggests that the program for children might profitably be planned with more reference to the future. Frequency of use in later years is not, of course, the sole criterion of the utility of a skill, for it may have served a good purpose at an earlier stage of growth. Moreover, some skills acquired in childhood may be quite handy to have at the adult level even if a person

seldom uses them (swimming, for example). However, this still leaves a wide field for selection.

Observations of children in free situations indicate that the program of motor activities, and even children's expressed preferences in games, are influenced to a large extent by conventions, and do not adequately reflect the interests that might be cultivated and enjoyed in childhood as well as in later years. An examination of the program in motor activities from the point of view of the future utility would, no doubt, show that many possibilities are now overlooked, such as training in handicrafts, building, mechanics, and in the skills and applied lore involved in hiking, woodcraft, nature study, gardening, and other outdoor pastimes.

The extent to which opportunities to acquire familiarity and some degree of skill during childhood may influence a person's leisure time activities as an adult is indicated in a study conducted in a suburban community.²⁴ By means of interviews, information was obtained concerning the "constructional" activities in which men had participated during the preceding year (activities involving the use of the hands and of tools as in cooking, carpentry, photography, building or repairing furniture, sketching, painting, etc.). It was found that few men adopted activities as hobbies or as favorite leisure time occupations in adult life if they had not had a taste of them before the age of eighteen. On the other hand, approximately one-half of the men who participated in constructional activities during childhood years also participated in them as adults. When reasons were advanced for not participating, 29 per cent of the responses were to the effect that the individual lacked knowledge or skill. The investigator plausibly points out that this percentage would undoubtedly be higher if real reasons, free from rationalizations, had been given in all instances.

Effects of Opportunities for Experience and Coaching. Although, as noted in an earlier chapter, special coaching may have little effect on the sequence and tempo of early motor development, there are, of course, countless ways in which a child can be helped to improve upon his techniques, even from

an early age. Simply to provide a child with facilities and opportunity to try his hand at various enterprises is likely to be helpful. But even if equipment and time and space are available, a child may fail to realize his potentialities. In connection with most performances, the example or direct help of another child or an adult may expedite a child's progress by showing him new techniques or better ways of proceeding. An example of this is offered in a study of young children's use of wheel play materials.²⁵ Children who had the facilities and who also had older siblings made more progress than those who had no older brothers or sisters.

Similarly, it has been noted that an adult can expedite a child's learning of better techniques in games such as ring-toss,²⁶ baseball, and numerous other projects. Such instruction, suited to the child's level of ability, not only helps to short-cut the learning process and to prevent the establishment of inefficient ways of performing, but the added mastery thus attained is likely also to add to a child's enjoyment of a project. Although this seems to be no more than a truism, it merits emphasis, for it can readily be ignored by a teacher who applies too literally the slogan that children should learn by doing in their own way, without assistance from adults. In practically all motor performances, including manual performances of an artistic sort, such as drawing, modeling, or playing a musical instrument, a child can profit from concrete instruction without necessarily suffering a loss in spontaneity or "creativity." This is especially true by reason of the fact that in children as in adults there often is quite a discrepancy between what a person is trying to perform and what, through lack of technique, he is able to perform.

Quite as important is the help that a child can obtain from his elders in finding a proper challenge to his growing motor abilities. Even on a rather well-equipped playground or shop a child is likely to fail to make the best use of the facilities if simply left to his own devices. Thus, in a school or camp situation, if similar equipment is provided for children over a relatively wide age range, the average child may reach a point

at which his activity consists to a large extent in repetition of standard performances when actually he might be led, through adult help, to discover new possibilities in the environment and to acquire a larger repertory of skills.^{27, 28}

Motor Skills and Social Adjustments. During childhood years much of a child's social activity with other children takes place by way of active play, and a child's competence in motor activities has an important influence on his social adjustments. For this reason, a child may, through physical disability, or lack of opportunity, or over-protection, or unfortunate experiences that lead to fear of venturing into active play, be seriously handicapped in his social relations with his peers. He is barred from many group activities, and in many situations he will be ignored or even become the butt of teasing and ridicule. His plight is especially unfortunate if his motor deficiencies are combined with a strong desire for social contacts and social approval. This does not mean, of course, that every child must be a robust athlete to achieve normal social adjustment, for some children who are lacking in motor ability gain acceptance and satisfying social contacts by other means, especially if they are bright or have other outstanding talents. In the case of the usual child, however, the acquisition of motor skills is of value not only from the point of view of the personal satisfactions that accrue from competence in self-help and independence of adult aid, but also from the point of view of good social and emotional relations with others.

SUMMARY

The general pattern of growth in stature, weight, and in the dimensions of various parts of the body tends to be similar in different individuals, but there are many individual variations with respect to the age at which growth is most accelerated and the age at which the maximum growth is attained. The growth pattern varies also with respect to different parts of the body that go to make up a person's total stature.

The process of development of motor behavior consists both of the differentiation of individual or separate movement pat-

terms out of previously more generalized and diffuse activities and also the combining of such movements into new systems.

Gains in speed, strength, and precision of movement appear throughout the period of childhood, but the rate of gain is not consistently uniform. Gains in strength roughly parallel gains in weight, with a tendency toward rapid gains at approximately the time of puberty.

During childhood years girls are somewhat more "mature" than boys of the same chronological age (notably in skeletal development) and they show many of the physical changes associated with puberty at an earlier average age. But boys tend to surpass girls in a majority of the motor activities and skills involved in children's outdoor games and athletic contests. The superiority of the boys before the adolescent period seems to be influenced in part by the fact that boys receive more practice. When the pubertal phase is reached boys and girls draw even farther apart. The average boy continues to show gains in strength and speed and in proficiency in various motor coordinations for a longer period than does the average girl. According to studies of children at the adolescent level, the differences between the sexes in motor performances become so prominent that beyond the junior high school age there are not many conventional athletic activities in which boys and girls can compete on equal terms. Joint participation at this level may still meet a social need.

During the first year of life a larger proportion of children show predominant use of the left hand than will be the case at later ages. It is likely that the proportion of left-handed persons would be somewhat larger than now is the case if each child were left to follow his own bent. Since the child is moving into a predominantly right-handed world, practical steps that may be taken to encourage right-handedness at an early age may be to his advantage. However, the practical value of being right-handed is not so important as to justify an effort to change children who have a strong disposition to be left-handed or whose habit of using the left hand for certain performances is already strongly established.

Individuals who stand high in mental ability also tend on the average to be somewhat superior in motor abilities, but the correlation between mental and motor abilities, although positive, is so low that superiority in one sphere does not betoken superiority in the other. A child who is average or backward mentally may equal or surpass brighter children in many motor activities. This fact has practical significance for education, for in a rounded educational program the satisfactions that come through recognition of successful achievement should not fall to the lot only of the children who are intellectually most able.

An individual may be quite uneven in his motor abilities. It is true that if an individual stands high in one kind of motor performance he is more likely to be competent than incompetent in other skills, but the relationship is so low that an individual's ability in one performance does not provide a reliable index to ability in other performances. This fact is also important from an educational point of view: a program in motor or physical education that is restricted to only a few conventional games or athletic events may fail to give all children opportunities that are commensurate with their abilities, and in the process it may to some extent distort children's social relationships and emotional adjustments by providing opportunities for successful achievement and social prestige to children who happen to be most competent in the limited motor activities that are stressed.

The motor and physical activities in which children engage in connection with their play cover a wide range of occupations at different age levels. However, they tend also to be influenced by prevailing customs and to fall into conventional patterns. At all age levels from a preschool period onward the average child has potentialities for mastering a larger number of useful and enjoyable motor skills than have been provided for in the usual educational program or in his opportunities in everyday life.

From about the age of eight years there is a falling off in the number of physical activities in which children engage. As children move on toward the adolescent level many of them

tend to become more sedentary and to become spectators rather than participants. This tendency continues through the high school and college levels. A part of the decline in motor occupations occurs by virtue of the encroachment of other interests. but a part of the decline also seems to be due to the fact that persons encounter practical difficulties in utilizing, at later age levels, many of the motor skills which they practiced assiduously in their games at earlier levels and to the fact that their earlier education has failed to stress skills and crafts that not only are enjoyable in childhood but also are practicable in later years.

The motor activities and manual skills that adults adopt as hobbies or leisure time occupations are determined to a large degree by the opportunities that were provided at the elementary or high school level for acquiring such skills. The evidence from many angles suggests that in the education of children we tend to fail to capitalize the potentialities for motor learning that would provide enjoyment and wholesome exercise at the childhood level and that also would be advantageous from the standpoint of health and recreation at the adult level.

QUESTIONS AND EXERCISES

1. If opportunities are available, observe and record the movements made by children at various age levels while in the process of carrying out one or more of the following performances:
 - a. Reaching for and picking up a small object (such as a little block, or a thimble, etc.) at the age of about three months, about six months, about nine months.
 - b. Throwing a ball at about the age of eighteen months, three years, five years, ten years.
 - c. Going up and down stairs at about one year, eighteen months, three years, five years.
 - d. Writing or scribbling with pencil or crayon at about eighteen months, three years, seven years, ten years.What are some of the main differences and similarities in the performance at various age levels?
2. If possible, observe two or more persons who are approximately similar in age but who differ decidedly in skill (say, a beginner,

one who has had some practice, and one who has had much practice or the same individual at various stages of his progress) in the act of carrying out a rather complex motor performance (such as riding a tricycle or bicycle, handling a tennis racket, batting a ball, swimming, knitting). Record, as accurately as possible, the movements involved, and, on the basis of these records, describe differences between the performers and the nature of some of the changes that take place in the acquisition of a motor skill.

3. Make a list of motor skills which you possess and use daily or occasionally (including everyday performances, athletic skills, manual arts, crafts, etc.). How many of these were first acquired respectively at the preschool (birth to six), the elementary school, the junior high, the high school, and the post-high school levels? Are there some performances which, in your opinion, might have been learned more efficiently if your first experience with them had come at a later age? At an earlier age?
4. Make a list of motor skills which are more or less common among adults but which you do not happen to possess. Are there any that you would especially wish you might have acquired? What factors prevented you from acquiring them? In the light of this, or your observations of motor deficiencies in people whom you know, what recommendations can you offer concerning ways of helping children to acquire useful or enjoyable skills in connection with the school program and through other agencies?
5. Although, as is pointed out in this chapter, there is, in general, only a low correlation between mental and motor ability, can you think of certain motor performances in which a very intelligent person would be likely to excel? What are the practical implications of this low relationship between mental and motor ability from the point of view of the "grouping" of children in connection with various projects at school?
6. To what extent, in your opinion, are the sex differences in motor achievement among boys and girls at the preschool and elementary school level due to the relative amount of practice and opportunity afforded to boys and girls?
7. Interview members of the class or people of your acquaintance who happen to be left-handed. Find out in what practical and specific ways a left-handed person is handicapped or has diffi-

culty. Get as much information as you can that would bear on the general question: To what extent is the disadvantage of being left-handed so great that special effort should be made to train all children to be right-handed? (Take account also of any hazards or emotional difficulties that might be involved if children with a strong tendency toward left-handedness were forced to change.)

Consider ways in which children's motor skills have a bearing on their social and emotional adjustments.

CHAPTER IV



EMOTIONAL DEVELOPMENT

The term "emotion" denotes episodes of anger, fear, joy, amusement, grief, disgust, and other conditions in which an individual is "moved" or excited. The varieties of emotional behavior are almost infinite. Emotion not only occurs in the explosive episodes that can be called by a definite name but to varying degrees pervades all thought and action.

Components of Emotional Response. Emotion involves a combination of feelings, impulses, and physical and physiological reactions. The *feelings* can be studied only through the report of the person who experiences them and who states that an experience is pleasant or unpleasant or that he feels depressed, angry, afraid, and so on. The nuances and mixtures of feeling are so varied that no one can fully sort them out.

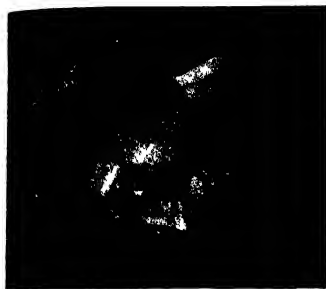
Among the *impulses* involved in emotion is the disposition to advance and destroy when angry or to retreat when afraid. Such impulses are associated with incipient or actual bodily movements that constitute the *physical and physiological components* of the emotional response. These latter range from reactions that can be detected only by delicate laboratory tests to gross reactions of the viscera and of the skeletal muscles, as when an individual vomits in disgust, leaps with joy, or throws his weight about in a towering rage.

Early Emotional Reactions. During the first days of life, the infant exhibits much behavior that seems to have an emotional quality, as when he cries and thrashes with his limbs. However, emotional responses show much of the same lack of differentiation that is found in other aspects of behavior at birth, the child makes no response to many stimuli that eventually will arouse him.

Differentiation of Expressions of Emotion. At the beginning, emotional reactions appear more in the form of general excitement than in the form of clear-cut expressions of anger, fear, joy, or other states. To be sure, these expressions of emotion never become stabilized into fixed patterns, but as a child grows older, such expressions do become differentiated so that it is possible, within broad limits, to distinguish between them.

Emotional Expression in Infancy. One procedure that has been used to study this development has been to take photographs of children while subjected to conditions designed to produce responses such as hunger, pain, anger, and fear. In one such study, in which moving pictures were used, it was found that infants during the first days of life did not display characteristic expressions that could be identified.¹ During the first year of life, however, such expressions become more clearly differentiated. In one study ² (by Goodenough) in which photographs of a ten-month-old child were used, it was found that adult examiners showed considerably more than chance accuracy in judging the conditions that prevailed when each photograph was taken.² Corresponding photographs of an adult who is trying to depict various emotional states (see Fig. 5) can be judged with a considerably higher degree of accuracy, as shown in a study by G. S. Gates.³ The facial expressions of emotion that can be seen in the everyday behavior of adults are, of course, influenced to a large extent by convention. They vary greatly from person to person, especially when used as a means of communication rather than as an involuntary expression of intense feeling. But whether voluntary or involuntary they show a high degree of refinement and differentiation as compared with the first reactions of an infant.

Progressive Differentiation of Emotional Expression in the Early Years. Among the more specific expressions that emerge during the first months of life are smiling in response to sight of the human face, and laughter at a later time. At four weeks, according to observations made by Gesell, distinct cries of hunger, anger, and pain can be noted.⁴ The quality of such cries is likely to vary in different infants, so that a mother might



4



3



2



1



۷

FIG. 3. REPRODUCTIONS OF EIGHT FACIAL EXPRESSIONS

Try to identify them, using such terms as "unhappy," "surprised," "frightened," etc. (From G. S. Gates, "An Experimental Study in the Growth of Social Perception," *Journal of Educational Psychology*, 1923, 14, and C. A. Ruckmick, "A Preliminary Study of Emotions," *Psychological*

be able with some degree of accuracy to judge what her own infant is crying about but fail to interpret the cries of an unfamiliar child. During the first year, likewise, expressions that seem to denote fear, delight, affection can be observed.⁵

As this differentiation of emotional expression proceeds, the movements involved tend to become more specifically adapted to the situation that produces an emotional response. In his first anger responses, for example, the child shows a good deal of uncoordinated movement that is not well suited to cope with the offending stimulus. As the child grows older, his movements during anger become more coordinated and more directly aimed at something or somebody.⁶ At all age levels, however, intense emotional excitement is likely to involve a good deal of uncoordinated activity.

Decline with Age in Overt Expression. Along with increased differentiation of emotional expression there is also a trend toward increased gradation of emotional response. There is a shift from wholehearted and violent reaction to more subdued response.⁷ The child who at seven months was "mad all over" and who kicked, stiffened, squirmed, flushed, and yelled loudly when his bottle was removed, or when his nostrils were being cleaned, is likely at seven years to show his anger in less all-pervasive ways (although he still has the knack of throwing a tantrum, a knack which he never loses entirely). During pre-school years there is a drop in the frequency of a child's crying and in more obvious displays of anger and fear. This decline, especially in the case of crying in response to hurts and in connection with anger, sometimes is more noticeable in the child's behavior outside the home than in his everyday behavior at home.

Many factors contribute to this decline in open expression of emotion. Through the use of language and other symbols the child is able to express his feelings more subtly. He also learns that in many situations his problem cannot be solved by violent demonstrations. The child is also under a good deal of pressure to be a big boy or girl and not to act like an infant. He is urged not to be a crybaby. At the nursery school and kinder-

garten age other children taunt him ("Fraidy-cat!" "Sissy-pants!") when he is afraid. He learns to conceal his hurt feelings and his fears. So, in time, some children refuse to reveal to others and try not to admit to themselves that there are conditions in their lives that frighten or anger or grieve them.

The tendency toward inhibition of emotional expression has gone so far by the time the child reaches school age that his feelings are hidden or disguised to a large degree. However, the decline in public display of emotion is not accompanied by a corresponding decline in private emotional experiences.⁸ The decline in direct expression, plus the fact that a child has difficulty in formulating his feelings in words, even when he may desire to do so, greatly adds to the difficulty of understanding the fears, resentments, and desires that influence his behavior in devious ways.

This fact that older children and adults go to great lengths, and are expected to go to great lengths, in inhibiting a display of their feelings is an asset in some ways, but it can also become a serious liability. Life would be stormy indeed if all people made loud outcries, or took to their heels, or stamped with their feet, whenever they felt hungry or frightened or annoyed. An idea of what this might be like can be gotten on occasions when adults do, in effect, make outcries like babies, such as when fifty or a hundred angry motorists all sound their horns when kept back by a stalled car. On the other hand, a consistent effort to suppress a display of feeling may cause trouble. There no doubt are many problems in life that could be solved if people could be more forthright in showing their feelings. If free to show his fears a person might sometimes, with the help of others, discover how to cope with the real or fancied dangers that threaten him. If free to show his anger, there probably would be many occasions when he and his associates could find a way of removing the cause of his anger.

Pressures against a show of feeling are especially unwholesome when they become part of a process which leads people to have a false outlook upon themselves. We may suspect that there is something false in men's everyday thinking about

themselves when we read the statistics on mental illness, emotional maladjustment, delinquency, crime, and other dislocations. Such statistics suggest that perhaps the pressures that bear upon children and adults in many cases go beyond the limits of human endurance. When pushed beyond his limits, the individual may pretend that he has succeeded in meeting the demands of society when actually he has failed. He may pretend that he is brave when actually he is anxious; that he is generous when actually he grasps much and gives little; that he bears good will toward others when actually he feels hostile. The necessity for such pretense is heightened by virtue of the fact that some of the pressures in our culture go counter to each other. We are taught to follow the Golden Rule, for example, but we are also taught to be sharply competitive.⁹ If an accounting could be made it perhaps would be found that the pressures that induce the growing child to inhibit or conceal or falsify his expressions of feeling do more harm than good.

CHANGES IN AGE IN EMOTIONAL SUSCEPTIBILITY

The conditions that provoke emotion change with the individual's expanding abilities and interests. In early infancy, emotion is aroused primarily by stimuli that impinge directly upon the child, and by conditions that affect his immediate, physical well-being. As the range of his activities grows wider, as his world grows larger and encompasses recollections of the past and plans for the future, his susceptibilities increase apace.

Influence of "Inner" Tendencies. A person's emotional reaction to a happening depends both upon the nature of the happening itself and upon his own inner state. This fact becomes increasingly apparent as the child becomes older. The same snowstorm may bring rejoicing to one child who wants to try his new sled, and sorrow to another who is kept from going on an automobile trip because of the storm. One child is exasperated with himself for striking out in a baseball game while another, in the same situation, still congratulates himself for having made the team. The child with high aspirations may feel that he has failed when he makes a mark which, to another

child with lower aspirations, is a triumph.¹⁰ In countless ways, the question as to whether something that befalls a child will be an occasion of joy or fear or anger depends upon what and how much he has to gain, what he stands to lose, what he expects of himself and what he thinks others expect of him.

This same principle works also, of course, in adult life. It accounts for the fact that people do not necessarily become increasingly serene, secure, contented, and free from fear as they gain in wealth and power. The more successful the adult is the more he may feel it necessary to keep confirming his reputation, especially if his idea of his own worth depends heavily upon the adulation he receives from others.

A child's susceptibilities will depend not upon learning alone but also upon maturation. Thus, as noted at an earlier point, he may for the first time show fear of strange persons at about the age of six or seven months,¹¹ coincident with improved ability to discriminate between strange and familiar faces.¹²

Influence of Changing Interests and Comprehension. As an individual's abilities improve and as his interests change he becomes impervious to many events that earlier produced an emotional response. As a child's interests expand beyond the home, he may become less jealous of his siblings. As he gains competence in motor activities, he is less frequently annoyed by failure to reach, lift, or dislodge small objects. As the range of his experiences widens, events that earlier were new and challenging and a source of delight come to be taken as a matter of course. However, this change does not mean that emotion plays a smaller role in the individual's life as he grows older, for as some situations lose their potency, others take their place. Throughout childhood and, indeed, throughout life, new or changing problems and contingencies continually rise.

The fact that the emotional effect of a certain external event varies as a child matures has been brought out in wartime studies of the response of children to air raids and other happenings.¹³ Children aged six or seven tend to react to an air

raid on terms of what they actually saw and what actually happened rather than to look upon the raid (as did adults) also as an ominous sign that the enemy had broken through the defenses and that more and bigger raids might be in the offing. However, the extreme fear exhibited by the adult, for whom a raid had such an ominous meaning, might heighten the child's fears.

Understanding a Child's Emotional Behavior. In order to understand a child's emotional behavior it is very important—and also very difficult—to take account of the fact that the feelings he has in response to what happens in the world about him are thus influenced by his inner state. Behavior that seems utterly illogical may, when examined in the light of this fact, prove to have quite a logic of its own. If a child is frightened when there seems to be but little danger, if he is deeply hurt or enraged by a slight affront, it does little good to point out to him that there is no cause for alarm or no reason to take offense. To help him it is necessary to consider what the occasion means to him, to consider that he perhaps would not be so frightened if he were not already anxious and that he perhaps would not be so sensitive to criticism if he did not already feel very uncertain about himself or very hostile toward others. The fact that a child's feelings may seem to be out of gear with reality has great implications for teachers. The fact that a pupil feels, for example, that he is unfairly treated is an important fact to take into account even if a neutral observer would conclude quite the opposite. Similarly if he feels afraid, or hostile, or lacking in self-assurance, without apparent good reason.

ANGER, HOSTILITY, VINDICTIVENESS

"Anger" is a term which denotes a large brood of emotional states, ranging from turbulent rage and impulses to rend and destroy to milder forms of resentment, irritation, and annoyance. Feelings and impulses of anger are found in jealousy in combination with fear and sometimes with grief, and in hatred, which involves both anger and fear. Anger occurs when an in-

dividual is thwarted and has no adequate response of a dispassionate sort, but still is not completely overwhelmed.

In early infancy, anger arises primarily through interference with bodily movement or thwarting the satisfaction of the child's appetites, as when his feeding is interrupted or delayed. As the infant's repertory of activities expands, the opportunities for interference of the sort that arouses anger increase. The thwarting may occur through the action of other persons, as when he is forcibly restrained or his requests are denied; through inanimate objects, as when an obstruction lies in his path; or by reason of the child's own lack of strength or skill, as when he is unsuccessful in a task, such as opening the lid of a box. As a child grows older, anger may be aroused by any form of interference or attack directed against his own plans or ambitions, his reputation, or against any person or condition with which his interests are identified.

Anger often bespeaks weakness of a sort (unless a display of anger is deliberately and effectively used as a bluff). For this reason, other things being equal, the greater the discrepancy between a person's competence and his own aspirations, or between a person's skills and the demands that are placed upon him by others, the more occasion for anger there will be.

Contributing Conditions. A person is likely to be more susceptible to anger when he is physically below par, is fatigued, suffering from lack of sleep, or is hungry.¹⁴ (An army presumably cannot fight on an empty stomach, but husbands, wives, and children can.) Likewise, anger frequently arises by reason of a piling up of irritations rather than a single provocation. Such an accumulation may occur if the child is exposed to demands and restraints from many different adults. Goodenough found, for example, that anger tended to be exhibited more often by children when there were many adults in the household than when there were few. If a child is subject to conflicting or inconsistent demands, or if he is compelled to perform an act over and over again, without visible improvement or accomplishment, as sometimes happens in connection with repetitive drills in the classroom, cumulative irritations are

likely to develop. In the same manner needlessly rigid supervision of a person's activities or the restraint imposed by being crowded into a small space with other persons may give rise to such an accumulation.

Frequently such irritations feed each other in a mounting crescendo of wrath. The annoyance caused by a stubborn knot in a shoelace leads to more vigorous action, with the result that the knot is tightened; as the person's exasperation increases, he breaks the lace; let the person at this juncture discover also that his other lace is knotted, and he will be in just the right mood to give a wrathful reply when someone reminds him that he should not be so clumsy. In relationships between persons, such irritations frequently arise, as when a pupil, already annoyed by failure in something that he is doing, is further annoyed by a reprimand from his teacher, who, in turn, takes offense at his retort, and thus further provokes the pupil's anger. In this manner, in the relations of people in the home or in the relations of persons in the workaday world, mighty animosities may grow from mild beginnings.

Mutual recriminations of this sort are aggravated by the fact that a display of anger directed against oneself arouses an impulse to respond in kind, and the further fact that anger carries with it an impulse to place the blame upon someone or something else.

The fact that an emotional reaction is determined to a large extent by something within the person himself is emphasized by the manner in which a certain external happening will anger one person but not another. The child who is jealous, on guard against any show of favoritism toward a brother, will be angered by a mild rebuke which another child would be able to weather quite calmly. A parent who likes to think of himself as being a very convincing and reasonable sort of person may be deeply provoked if his child contradicts or argues against him in a manner that would not be especially annoying to a parent who takes a more humble view of himself.

Expressions of Anger. The crying and overt physical expressions of anger exhibited by a young child give way, at an

early age, to a multitude of covert methods of attack. In early childhood, these may take the form of numerous acts of disobedience and resistance. When the child has learned to talk he gains new resources for expressing his anger. Numerous illustrations of such expressions of anger are described by Goodenough.¹⁴ One three-year-old child, for example, would vent her anger by saying, in the hearing of her mother, that she wished she had another mother.

As time passes, expressions of anger come to include sneers, taunts, innuendo, backbiting, gossip, barbed witticisms, satire, ridicule, and countless other forms of verbal attack. At later ages, likewise, the angry person's expressions of anger may range through all the various forms of opposition and belligerency, from whispering and noise-making in school, when the teacher especially desires quiet, to truancy, delinquency, and crime. The development of imaginative ability provides additional means for the expression of anger in vicarious ways, and for projecting schemes for revenge or future attack. The child may imagine himself dead or violently ill, meanwhile savoring the grief and remorse of his foes, or he may imagine himself in a hero's role putting to shame those who once opposed him. An individual may go so far as to support causes that seemingly spring from a desire for social uplift but that actually serve a vindictive motive.

Anger often leans to an "I'll show 'em" attitude. Spurred by abuse and mistreatment from others stronger or less scrupulous than he, a child may acquire a strong urge to outdo others. In his competition with others, the older child sometimes shows an underlying streak of hostility. This drive to succeed, to gain the upper hand, may be all the more compulsive if he, at the same time, looks upon others as being hostile toward him.

Recognition of the fact that anger may be expressed in numerous ways, frequently without signs of asperity, is useful in dealing with angry persons. Whenever an individual, child or adult, without apparent good reason, behaves in a manner that seems to be inappropriate and which causes discomfort, or may be construed as an indirect attack on someone, it fre-

quently is helpful simply to stop and inquire of oneself, "Why did he do that?" Such an inquiry will often provide clues to underlying motives and suggest ways of helping the angry one to learn better ways of dealing with his problems.

The same rule is also a good one for an adult to follow in his own life. By asking himself why he took such offense at this remark or that happening, why he is so prejudiced, why a certain mannerism so annoys him, an adult can sometimes discern hostile impulses within himself that he had not fully recognized before. He may discover, also, if he is able to look at himself frankly, that anger sometimes is due more to quirks, or weaknesses within himself, or lack of confidence in his ability to hold his own, than to the nature of the acts of those who offend him. He may also discover, that one thing, among others, that annoys him is to see behavior in others which he resents in himself.

Values of Anger. Needless to say, anger may serve a valuable purpose at times. Under the spur of anger directed against himself, surrounding conditions, or other persons, an individual may overcome his inertia or irresolution, be jarred out of an unwarranted degree of complacency concerning his behavior and achievements, and proceed to constructive accomplishment. Again, anger at the misbehavior and inconsiderateness of others may, in some instances, lead an otherwise overindulgent parent or teacher or associate to re-examine his practices and to adopt wiser ways in his dealings with other persons. Quite frequently, however, an individual's anger simply aggravates matters for himself, brings distress to others, or serves as a way of finding a scapegoat.

Methods of Dealing with Anger. The foregoing account of factors contributing to anger and some of the expressions of anger suggest some of the means of dealing with it. Avoidance of needless restraints or the assignment of insurmountable tasks, tedious repetition, unnecessary confinement, and inconsistent demands would go far to prevent occasions for anger, especially on occasions when an individual is already irritated by reason of previous provocations. One rule that perhaps is

development. When competitive behavior develops **and** he becomes aware of his own performance, as compared **with** standards set by others or imposed by his elders, he **may** become afraid of failure and humiliation. The onset of **puberty** and the emergence of strong interest in the opposite **sex** may entail fears centering around impulses that did not trouble him so much at an earlier time. Likewise, at the adult level, and on toward old age, as already suggested above, his fears will be influenced by the varying contingencies of maturity and old age.

Fears at Different Age Levels. As we have seen, during early childhood, the child's fears occur predominantly in response to concrete happenings in his immediate environment. During the preschool years, more and more of his fears are formulated in terms of imaginary or anticipated dangers. At the elementary school age, and from then onward, a large proportion of fears concern misfortunes that never materialize. As the child grows older and abler, there is a decline in his fear of numerous events that scared him at an earlier time, such as noises, unfamiliar persons, places and situations, everyday objects, animals, and persons.¹⁶ However, individual children may fail to outgrow such fears, by reason of the harrowing shock of the original experience, or by reason of recurring experiences that strengthen the original fear, or by reason of failure to gain in understanding and mastery of themselves and their environment as they grow older. Certain childhood fears, such as fears of animals, the dark, being alone, criminal characters, ghosts and the like, are likely to persist into adult life sometimes in much the same form, sometimes in a modified version.

Factors Contributing to Fear. Several factors may have contributed to the development of the fears that a person shows at any given time. The fear may be in the nature of fright that is caused by a definite happening, as when a child dashes for the fence when pursued by a bull. It may represent a residual effect of an earlier, quite definite, frightening episode, as when the same child later is afraid to approach the

bull, even when the bull seems to be in a tranquil mood. It may represent a reaction to things or events that were associated with the original fright, as when the child fears to approach the locale of his unhappy encounter with the bull, or is frightened when he hears a noise resembling a bull's bellowing, or feels uneasy when he sees the bull's owner in a place remote from the pasture.

Again, fears may have their inception through a process of association that is quite devious. For example, following the excitement and fright occasioned by a fire that he carelessly started while playing with matches, a child may have disquieting thoughts about fire and his own misbehavior when he goes to bed at night. Such thoughts may thus be associated with darkness and with being alone in a room, with the result that the child begins to show uneasiness about being alone in the dark. If, in this situation, the child is especially disturbed by his own misconduct, his disobedience in playing with matches, the irresponsibility he showed in setting a fire, then his fear of fire, of the dark, of being alone may, in effect, partly represent a fear of something within himself.

Fear precipitated by a definite frightening episode may be momentary and leave no detectable after-effects, or it may influence future behavior in complex ways. The child who is startled by a pounding radiator may subsequently be afraid to approach the radiator or fear being left alone in the room. A child who is scared by a piercing blast of the whistle of the steam engine may subsequently avoid this and other similar machines and be afraid of the engineer if he later meets him alone. The child may overcome his uneasiness concerning the engineer mentioned above. But some after-effects may remain so that some years later, when asked to rate the degree of "geniality" or "friendliness of expression" exhibited by a number of photographed faces he might unwittingly give a low rating to a face that resembles that of the engineer.

Influence of Background Factors. The fears of everyday life are influenced not only by the shock of terrifying experiences but also by the cumulative effect of everyday setbacks, failures,

reminders of weakness or error, and the numerous factors that help to undermine an individual's security and self-assurance and his certainty concerning the adequacy of his own powers. It would not be possible to list all the factors that contribute to such uncertainty, but a few may be noted. A child's fears are influenced not only by the many reminders of his helplessness that he encounters in his own direct experience but also to an important degree by the behavior of his parents. He will be influenced by the example of fear set by his parents or elders. Such an example may suggest to him that there is danger and that the danger is one with which even the adult, upon whom he depends for help, is unable to deal.

Fears likewise are aggravated by the practice of intimidating the child and of playing upon his fear as a means of discipline. When a child is threatened with abandonment or told that the bogey will get him if he does not obey, he is thereby reminded of a possible danger, and, at the same time, it is implied that he cannot rely upon the help and good will of those who use this means of controlling him. By reason of his credulity, the child likewise is susceptible to suggestions that are not wittingly designed to scare him, as when he hears tales of violence and of weird and uncanny happenings.

To safeguard a child against all such influences would be impossible, of course, and perhaps even unwholesome, but this does not alter the fact that experiences of this sort may have a profound effect. As a child grows older, and as he passes into adult years, reminders of his shortcomings and weaknesses continue to occur, frequently through his own experience. Discrepancies between his conduct and the standards impressed upon him by others, or formulated by himself, may give rise to feelings of guilt that color his outlook upon the present, leading him to blame himself as he reflects upon his past, and to feel forebodings about the future. Similarly, he may have a highly developed capacity for self-criticism and self-appraisal, coupled with high aspirations, with the result that he experiences intense stage fright, for example, before a friendly and

admiring audience, or worries concerning his ability to do his job when actually he is very competent.

By reason of the complex factors that underlie fear, the particular manner in which a fear is formulated or expressed may be relatively incidental. In describing his fears of imaginary dangers, a child may now mention a lion, at another time a gorilla or a walking corpse that he happens to have seen in the movies, at another time a bearded robber about whom he has heard on the radio. By the same token, a fear identified as a fear of "dogs" by one child may have quite different meanings than a fear of "dogs" mentioned by another child. When a child names now one thing, now another, it is possible that the particular image in terms of which fear is described is less important than the underlying disposition that leads to fears of vague and imaginary dangers. Moreover, it is possible that a child may name many different fears—e.g., of lions, wolves, kidnappers, that all represent a similar apprehension. In like manner, an adult of the "worrying kind" may be apprehensive now concerning his ability to hold his job, now concerning his bank account, now concerning the possibility that something he said might have caused offense.

Values of Fear. Needless to say, fears in their various degrees and manifestations provide valuable safeguards against harm. They may restrain the individual from exploits that would end in disaster. Frequently fear promotes prudence and caution and serves as a spur to endeavor and preparedness against the future. A good scare may induce a person to mend his ways after the exhortations of others and his own half-hearted resolutions have borne no fruit. And fear of consequences also serves as a prop to thrift, sobriety, and other virtues.

Although fears frequently are viewed with disfavor, there are occasions when adults who are in charge of a little child wish that the child were more cautious, if not definitely afraid. After a child has learned to walk and climb, for example, there often seems to be a disparity between his ability to get into

dangerous situations and his recognition of danger. He may be able to climb from a chair to the top of a high table, totter precariously on the edge, and, in the process of getting down, clumsily displace the chair so that he misses his footing and falls to the floor. He may come to grief through lack of caution in traffic, or through trying to swallow household ammonia or articles from the medicine cabinet which he has procured through mischance. One result of this lack of ready-made fear or caution in response to things that may cause bodily harm is that a child frequently is subjected to interferences of a kind that he cannot understand. Even in the best regulated families interferences of this sort may be a contributing factor in the development of resistance or negativism.

While the capacity for fear, on the one hand, may help to promote caution and prudence, it also may help to give zest to everyday living. In his early play, and later in his games and sports, a child will frequently court danger, although usually within a general framework of safety. Adults, too, will frequently play with fear by taking chances and by meeting danger vicariously in books, motion pictures, and the like. As an individual becomes older, however, he usually becomes more conservative in this regard and is less disposed to take chances in actual life unless other strong motives come into play.

Whatever may be the positive values of some fears, it also must be said that fears entail much needless suffering. This is true when a person's fears deal with dangers that are quite improbable or are out of line with reality, and represent a weakness within himself rather than a response to actual danger. It is especially true, also, if the individual by reason of his fear is inhibited in his efforts and shrinks from undertaking the very activities that would best relieve his distress.

Prevention and Overcoming of Fear. Complete prevention or elimination of fear would be impossible. The fears of children are so unpredictable that no amount of adult ingenuity could forestall all occasions for fright. Moreover, the very protections with which an individual or a society surrounds itself as a safeguard against fear may foster dependence and weak-

nesses and a lack of resourcefulness that invite future calamity. This fact may be recognized and may still leave room for steps to forestall or to overcome fears that seem to have no useful purpose but serve only to inhibit action and to cause distress.

Often it is difficult to relieve the conditions in the individual's everyday life that make him afraid. Sometimes, however, relief can be obtained from standards that are too high and that bring continued failure, belittlement, over strenuous competition, tension, or rejection in the individual's relations with others.

Forewarning will sometimes help to forestall fear of a new situation, and even more helpful will be the procedure of initiating a person into a new situation by degrees rather than abruptly, as when a familiar person remains on hand for a time, or a child is given some freedom to explore and approach in his own way. One study of children undergoing dental treatment, for example, shows how adults differ in their ability to "ease" a child into a potentially trying situation.¹⁷ This graded approach technique holds not only for young children but at all age levels, and it can be adapted also in numerous ways by an adult for his own purposes, as when he ventures into more and more difficult traffic while learning to drive a car.

In trying to overcome an established fear, verbal reassurances and explanation from others may be of some value, but frequently an explanation that one's fears are groundless has little effect. More valuable are procedures that may be used to bring the individual into active grips with the situation or condition that he fears, that promote his practical understanding, or, in the case of fears of what the future may bring, practical measures and resources for countering an anticipated misfortune. In studies of children it has been found that such active procedures, combined, as the occasion warrants, with the graded approach technique, practice, the example and stimulus of other children or adults, can be applied to a wide variety of situations at home and in school and camp.¹⁸

This policy of helping a child to acquire ability and confidence in coping directly with a thing that he fears may be

applied most easily in dealing with fears of a rather simple and straightforward sort. It is difficult to apply when the nature or source of a fear is quite complex and obscure. If a child's fear of fire is complicated by an apprehension about his own tendency to be disobedient and bad (as we have assumed in an example cited above) the experience of joining with his father in dealing with fires, starting them and putting them out, learning ways of preventing or escaping fire, and the like, may fail to touch upon the child's main difficulty. Even so, however, the experience is likely to be to the good, for the very fact that the father gives time and attention to him in this friendly manner may strengthen the child's ability to cope with his fear.

Fear as an Educational Problem. We have noted that a large proportion of children carry a burden of seemingly irrational fears that appear to be far in excess of what is needed for promoting safety and a prudent way of life. This presents a challenge to our entire educational system—to the home, the school, and all other institutions that are a part of this system. In our school program we have tended to be quite unconcerned about this matter. Courses of study and statements of policy frequently make little or no mention of this aspect of child life. This is all the more curious by virtue of the fact that most adults know from their own experience how damaging fears can be. It is true that the role of the school in the emotional lives of children is somewhat limited, yet that role is important as far as it extends. It is in connection with the academic and social life of the school that many children have their most poignant experiences of failure, humiliation, and rejection. In our schooling of children we have tended to be so obsessed by conventional notions as to what a school should do in teaching certain academic skills that relatively little thought and little research has been devoted to the question of what the school might do with respect to the emotional welfare of children.

PLEASURE

Pleasurable states range from turbulent joy, which may be so intense that the individual's behavior is temporarily disor-

ganized, to the quiet pleasures and satisfactions of everyday life. Pleasure may arise through the gratification of cravings such as those associated with hunger, thirst, sex, and demand for rest when one is tired. Pleasure is also frequently associated with free and unimpeded activity, the exercise of mental and motor capacities, and ventures into new experiences. As far as can be judged from his overt behavior, it appears that the young child gains satisfaction from sheer activity. As noted earlier, he spontaneously undertakes much exercise of his limbs and his voice in the early stages of motor development and language formation. He seeks social contacts with other persons and seems to find delight in social interchanges. As his abilities expand, he throws himself into imaginative activities, he explores and manipulates, exercises his curiosity, ventures into enterprises that involve the utilization of his various powers.

As a child grows older, events that gave pleasure at an earlier day may lose their appeal as they come to be taken in stride or no longer represent a challenge, and new channels of experience take their place. The child at the age of two years, for example, may no longer show signs of delight in response to pots, pans, bottles, and small wheeled objects that can be pulled by a string. Even the pastime of closing doors or opening drawers and throwing their contents upon the floor may be abandoned with other "pleasures of youth." The same child, however, may squeal with delight if he again is presented with a music box or a wagon that he was unable to handle earlier, or he may show signs of enthusiasm in opening a carefully wrapped package that would once have baffled him.

During childhood, a youngster is continually embarking on the new ventures, which, with the passing of time, are "laid by," and in the meantime the ability and opportunity to undertake new experiences emerge. Indeed, the child's very limitations at any period of his growth, while they may give rise to insecurity, anger, or fear, also, in a sense, serve as reservoirs of future satisfactions, for the process of overcoming these limitations is a source of pleasant experience. This source of satisfaction continues into later years, but with advancing age some

persons seem to become so set in their ways that they no longer can find new worlds to conquer or new horizons to explore, with the result that they lose much of the pleasurable anticipation that prevailed when they were younger.

It seems that for some people the stable satisfactions of everyday life, and the security and power that older persons sometimes are able to acquire, can compensate for this loss. In other cases, however, advancing years bring boredom. Sometimes distinct "feelings of futility" may beset mature persons who, judged by external circumstances, should be comfortable and contented with their lot. One factor among many others that sometimes brings a fresh store of satisfactions, and may even revive and intensify some of the challenges and the joys of an earlier day, consists in having and rearing children. Grandchildren may also be a boon in this respect. It may be pointed out, in passing, that these satisfactions are also available in some measure to people who function as substitute parents. It is interesting to note that when teachers, for example, list the satisfactions connected with their everyday work many of the items correspond to the satisfactions that parents find in the rearing of children.

Some Practical Considerations. To provide enjoyment through activity, an individual's enterprises should be scaled in such a manner that they challenge his abilities but do not continually overtax his powers. A proper balance would, of course, be impossible to achieve. Many of the activities of everyday life, even from an early age, consist of chores and routine, repetitious duties that must be done whether they are challenging or not. Likewise, it would be impossible, and inadvisable if possible, to arrange every project at the childhood or adult level in such a manner that the individual never had the experience of failure. This can be recognized and still leave room for taking practical account of the above statements concerning pleasure in activity.

In school situations, one often finds pupils who have little opportunity to experience the satisfaction of successful achieve-

ment because they cannot keep pace with the rest of the class. Again, one finds many pupils who are bored and who are driven to daydreaming or mischief because the work is not challenging enough. By reason of the fact that individual differences are so pronounced, it would not be feasible to arrange for a school program that involved just the proper stimulation for each child, but much can be done to modify the requirements placed upon the less able child, to give him a chance to perform activities in which he is most competent (as when a child who is backward in arithmetic receives recognition for drawing or music if he has a talent for these), and to give more privileges, more freedom to move about, and special assignments to those who are most able.

At the adult level, likewise, the importance of having a stimulating occupation is shown in many ways. One of the most difficult problems in life is the adjustment to the loss of an occupation, as when a mother's children grow old and no longer need her constant care, or a person reaches the age of retirement and is left at loose ends, or an able-bodied person loses his job and suffers the demoralizing effects of being unemployed. Occasionally, an individual who lacks an occupation or is bored with the one he has will welcome an emergency, such as illness in the family or threatened economic loss. For some persons, even the calamity of war serves as a momentary tonic, if such a calamity promises to mobilize unused energies and to give the individual a vital function to perform.

Praise and Reproof. The topic of praise and reproof is discussed elsewhere in this book, but it deserves passing mention in the treatment of pleasurable and unpleasurable experiences. Praise, when deserved, is a frequent source of pleasure, as everyone knows. This is all the more true by virtue of the fact that what constitutes commendable or successful endeavor is, in many respects, relative to social standards. Thus it is that a person who actually has done well, or as well as he can, is not only pleased but sometimes very agreeably surprised when his efforts are commended. In like manner, reproof may have the

opposite effect, for it indicates that others do not have a high opinion of his performance, whatever his own evaluation of it may be.

Praise thus may bring satisfactions that otherwise would not be enjoyed. Praise may also serve as a spur to greater efforts, although occasionally it may lead a person to rest on his laurels. Teachers quite generally subscribe to the view that praise is an effective incentive. In one study it was noted, for example, that all teachers in a group of about 120 wrote that they "agreed" with a policy of "using praise more often than rebuke or reprimand as an incentive in school work."¹⁹ Yet, in another study involving a similar selection of teachers in the same school system it was noted that this policy was by no means consistently practiced. During a series of visits to a number of classrooms, observers recorded, among other matters, the instances in which individual children were reprimanded, reprovved, or informed in one manner or another that their behavior or answers were unacceptable, as well as instances in which the children received praise, commendation, or favorable recognition in one form or another.²⁰ In a majority of the classes, "negative" items of reproof and the like outnumbered "positive" items of praise and recognition. In one group of teachers the ratio of "negative" to "positive" items ran as high as five to one. This ratio need not necessarily be regarded as representing a bad state of affairs (it was noted, for example, that one teacher who often reprovved also seemed to be very well liked by reason of other qualities that appealed to her pupils), but be that as it may, the preponderance of negative items in a group such as this is still of some interest.

If similar observations were made in the home it is likely that a preponderance of negative over positive comments would likewise be found in many cases. What often seems to happen is that good deeds or acceptable behavior come to be taken for granted, while misdeeds or performances that are below the required standards are reprovved. Much the same also seems frequently to occur in relations between adults. A man does his job well, day after day, without receiving, or even expecting,

any special word of commendation. Praise is reserved for eulogies after such a worthy person is a corpse. Much the same may occur in the everyday affairs in the household. A person may grumble when there is no fresh cream for his breakfast coffee, quite forgetting the hundred and one mornings when cream was provided, sometimes at the expense of some inconvenience to others.

Many children at an early age learn to expect reproof for misdeeds or failure without expecting corresponding praise for meeting expectations or even surpassing them. To be sure, there is much unspoken or tacit commendation and approval. But the fact still remains that most adults would do well now and then to remind themselves that children, whether they be "problem" or model specimens, and adults, whether they be humble or mighty, receive a lift from occasional praise or special recognition.

AFFECTION

The beginnings of affection appear during the first few months of life. In time, the affections of the normal child come to embrace many objects and persons. As he advances into adulthood, he will entertain varying degrees of affection for his home and family, his neighborhood and his country, and institutions with which his interests are identified. The nature of his attachment will vary at different times and in different circumstances.

The potentiality for affection is inborn, but changing interests as a child grows older and keeps learning play an important role in determining the manner in which this capacity is expressed and the objects with which it becomes associated. The affection of a young child for his parents will be influenced by the care they bestow upon him. Through intimate association in his everyday life he may also acquire a fondness for a certain toy or household article, such as a blanket, and such objects may come to be prized more than newer or costlier possessions. As the child becomes sexually mature, his affection for someone of the opposite sex will include tenderness and de-

sire. The coming of children of his own will enlist affection in which new elements of impulse and feeling come into play.

In all of the manifestations of affection, whether they involve attachment to a teddy bear, one's parents, spouse, children, college, or country, there may be varying admixtures of self-interest. However, the fact that love for others may represent only an extension of self-love is not as important as is the fact that normal human beings have the capacity for developing affection that enables them to give themselves to others, to rejoice in another's good fortune, to enjoy the companionship of others as something good in its own right, as an end in itself. This capacity for affection is tapped in countless prosaic ways in a mother's daily care of her child. It sometimes is tapped on a larger scale when calamity strikes a home or community, or in times of national emergency and disaster. It is a stronger safeguard against social disintegration than the best laid plans of erudite men.

Importance of Affection in a Child's Life. The affection of his elders is important for the normal development of a child and throughout life a person has a strong desire for assurance that he is wanted, that he belongs, and can count upon the loyalty and devotion of someone else. Such manifestations in childhood not only promote satisfaction and security but also provide examples from which the child can learn and which he can emulate in due time. Especially unfortunate is the situation of a child who is denied affection while other members of his household receive it.

Affectionate fondling and embraces may, of course, take the form of parental self-indulgence, and if bestowed in excess they may operate as a form of interference with the child's activities. That individual children may construe them as such is indicated by the fact that children of preschool age sometimes use hugging and kissing as a disguised form of aggression. Moreover the child will be at a disadvantage if the affection bestowed upon him at home curtails his ability to form attachments outside the home.

During recent years a great many writings in psychology

and education have emphasized the importance of affection in the child's life. Much can be said in support of this emphasis, both from the point of view of the needs of children and the needs of their elders. The child begins life utterly helpless and he remains dependent upon others for many years. His physical survival and his psychological well-being depend upon the concern others have for him. The value of affection does not consist in something mysterious or apart, for the affection of his elders can be translated into something quite tangible in the practical details of everyday life. It appears in terms of the gentle way in which he is handled, the patience that is shown when his demands interfere with other duties or interests (including a parent's interest in getting a good night's sleep), in the extent to which he is played with, in the manner in which his hurts are soothed and his fears are quieted, in the manner in which, as he grows older, his questions are answered, his interests are respected, his desire to share and participate in some of the activities of his elders is gratified.

It seems quite reasonable to find, as has been found in one study,²¹ that children who lived in homes where they could enjoy the attention of fond adults showed a more favorable course of development than children kept in an institution. On the negative side, it is not difficult to understand how children who receive mass care in an orphan's home may be more defensive in their attitudes, less prepared to expect or to accept a friendly approach from others.²²

Importance to Parents and Teachers of Children's Affection. But the need for affection, and the values that accrue from it, do not flow in only one direction. Even during the first year of life children do not only receive, they also give. They show affection for adults who care for them. Such manifestations may appear even if they have received a minimum of attention or a minimum display of fondness from others.²³ Moreover, just as the affection of an adult is important to the child so also the affection of a child is important to an adult. In a recent study²⁴ it was found that one of the most prominent satisfactions which parents reported, when asked to tell about

the satisfactions connected with having and rearing children, was the companionship the children afforded, the affection they displayed for their parents, the opportunity they gave for the parents to share and participate, in common activities, in a friendly way. Affection is important not only to the child but also to any human being at any time of life.*

The values of an affectionate relationship are indicated, as noted above, by the unfavorable turn a child's behavior sometimes takes if he is not in friendly hands or if he is actually disliked. According to one study²⁵ lack of an affectionate relationship with his parents may be a factor contributing to delinquency. Even worse, perhaps, in terms of human distress, is the fate of children who do not rebel or fight back but carry their sufferings in silence in the form of anxieties and fears. As noted elsewhere in this chapter, many children have fears which they trace to threats and hurts received from other people. In addition to such fears, many children also have fears that seem to bespeak a lack of assurance in their relations with others, including fear of being left alone and abandoned.

Children likewise desire acceptance and affection from their teachers, councilors, club leaders, and other adults who substitute for parents. There is, of course, much overlapping between the characteristics of a good teacher and those of a good parent. In a study in which children described the teachers whom they liked best, a large percentage of the replies dealt with qualities that characterize an agreeable human being in any walk of life, including items such as kindness, sympathy, a genuine interest in children as children, and fairness combined with firmness.²⁶

Observations such as the foregoing suggest that it would be well for all who have children in their care, at home, at school,

* It is an ironic fact that parents who are deeply attached to their own children can, at the same time, be very callous and even cruel in their attitudes toward other children. The fact of having suffered when one's child is sick, of having tried to share his sorrows, does not necessarily, it seems, make a person more sensitive and sympathetic toward other children. Indeed, a parent's affection for his child may take a selfish, competitive turn, so that far from being warmhearted toward other people's children he regards them as rivals of his own offspring.

in camps, in hospitals, and other places, to allow themselves not only to feel but also to show in their whole manner a warm-hearted attitude toward children. This does not mean, of course, that a feeling of affection will solve all problems. An affectionate teacher still needs to know the knack of good teaching. The fact that he is fond of children will help, but will not, in itself, automatically make him a wise teacher. Nor should the fact that affection is important lead one to make a false show of it or surround the child with an artificial structure of cheerfulness and security; or do for him in the name of affection, things which he, for his own well-being, must necessarily in the long run learn to do for himself.

LAUGHTER AND HUMOR

The earliest age at which a child is expected to show "a sense of humor" is difficult to determine. Even before the age of a year some children have been observed to show roguish behavior, as when a youngster creeps rapidly toward a forbidden object while a parent looks on, then stops short, looks laughingly at the parent, then makes further false starts as though trying to make the parent laugh, too. Situations such as this, involving an element of "fooling" and doing the unexpected, can be noted more frequently as children grow older.²⁷

The situations that provoke laughter, or by means of which a child appeals to the risibilities of others, eventually become varied and numerous, of course, but certain rough parallels can be observed between the situations that the child seems to regard as funny and other general aspects of his social and intellectual growth. Thus, his ability to see humor in incongruities of a spatial nature (such as a tiny hat on a large head) to which he did not respond at an earlier time, depends in part upon the development of perception of space and size. As he progresses in his language development, he will increasingly be able to appreciate humor involving a play upon words. When he has acquired some degree of understanding of social conventions, he can find humor in tabooed topics or situations in which the joke is on persons who are in authority. With the

approach and onset of puberty, he may "get the point" and relish jokes relating to sex that did not appeal to him so strongly at an earlier age.

Practical Implications of Laughter and Humor. Unfortunately, there are no neat rules that can be offered concerning how a person can cultivate or utilize a "sense of humor" in his dealings with others. The most common (and most futile) admonition is that one should not take oneself too seriously. There are, however, a few rather simple generalizations that can be made. One rather obvious generalization is that most children, even at an early age, welcome an opportunity to laugh. Even a very sober child, whose elders are constantly weighed down by the grave responsibilities of parenthood, may show a surprising capacity for laughter when in the company of a playful person. At the school age level, pupils are only too pleased to find something to laugh at, although frequently the atmosphere at school, as at church is so solemn that children hesitate to laugh when something funny occurs, unless the teacher gives a signal, such as smiling or laughing himself.²⁸ Another point that is quite simple but often ignored, is that children (like adults) would rather laugh *with* others than be laughed *at*. One investigator²⁸ noted that many teachers are more inclined to evoke spiteful or vindictive laughter that has the effect of humiliating a pupil than to use laughter in a friendly way.

SUMMARY

Components of emotional experience include feelings, impulses, and physical and physiological reactions.

The development of emotional behavior parallels and is interrelated with other aspects of a child's growth. During the first days of life the infant shows much behavior that seems to have an emotional tone, but his behavior seems to be more in the nature of "general excitement" than in the nature of patterns that correspond to fear, joy, affection. Moreover, the infant appears to be impervious to many stimuli that eventually will arouse him.

With the passage of time the child's emotional behavior becomes more clearly differentiated. However, at no time of life is this differentiation so complete that there is any one emotional state that can be defined in terms of symptoms and expressions that are unique and distinct from the expressions that occur in other states. The varieties of emotional behavior are almost infinite, and emotion, in varying degrees and manifestations, pervades all thought and action.

As a child's abilities mature and the range of his experiences widens, there are changes in his susceptibility to stimuli that cause emotional response. At the beginning, his emotional reactions occur mainly in response to events in his immediate environment that impinge directly upon him.

As he grows in his ability to discriminate and to understand meanings associated with happenings that occur, as he enters into a wider range of social contacts, as he acquires the ability to imagine, to lay plans for the future, and to anticipate the future, and as he gains in competence and familiarity in dealing with everyday happenings in his immediate environment, there is a falling off in some emotional reactions that appeared at an earlier age and an increase in his susceptibility to other circumstances. His emotional susceptibility will be bound to his hopes and aspirations and what he personally has at stake. His inner state, his ideals, and his scruples, the standards he has set for himself, the values he holds, will have an important bearing on his tendency to react, to an external happening with joy, or self-reproach or anger or fear. By the time he has reached the elementary school age, and to a prominent degree thereafter, his fears will be concerned to a large extent with imaginary dangers or with dangers that might befall. Many of his fears are likely to seem irrational in the sense that they appear to be quite out of proportion to dangers that actually threaten, and similarly, the child's anger as he grows older is shown not only in response to direct interference but to events that he regards as possible interferences with his desires, goals, plans, and purposes. There is likewise a shift in the occasions that produce joy or satisfaction: activities that earlier pro-

vided a challenge and a seeming source of delight, such as his first successful venture in stair climbing, or riding a tricycle, lose their stimulating value as the child gains mastery and learns to take them in his stride; in the meantime, other delights may occur as the child's powers expand and the range of his activities widens.

With advancing age during late infancy and preschool and elementary school years, there is a shift from "wholehearted" to more graded or subdued forms of response. In keeping with this change there is a noticeable decline in crying. Overt signs of fear such as flight or clinging to adults tend to diminish. Explosive symptoms of anger give way to more subdued expressions. In many instances private thoughts and make-believe activities are substituted for overt action. One result of this is that the older child's feelings tend to be rather inscrutable. He may entertain fears that are not recognized even by those who daily associate with him, and harbor resentments which are difficult for another person to detect and which influence the child's behavior in ways that are devious and hard for his associates to understand.

An important feature of the child's emotional life is the affection that he receives from others and the development of his own affection for other persons. Real or imagined threats to a child's relations with objects of his affection may produce jealousy of a severe order. Children who are rejected, or who feel that they are not wanted and that no one is fond of them, are likely to encounter many problems of adjustment.

In the foregoing pages we have seen indications both of the values and of the disadvantages that may be involved in emotional behavior. As pointed out in these earlier pages, even the emotional states that betoken failure or lack of ability to cope with an issue in a straightforward manner—such as anger and fear—may have salutary effects. On the other hand, a display of anger or the harboring of resentments frequently merely aggravates, rather than solves, a person's difficulties. Likewise, a person may be burdened with fears quite out of proportion to what seems needed to promote caution and prudence.

It would be impossible completely to prevent the occurrence of anger, fear, or other forms of emotional distress. However, in everyday life such emotional reactions frequently are aggravated by interferences, threats, examples, and various forms of intimidation that could be avoided. In like manner, it has been emphasized that in promoting wholesome satisfactions and pleasures it is important, among other things, to give the child an opportunity to enter into activities that provide an appropriate challenge to his growing abilities. Frequently anxieties and resentments arise through the cumulative effect of circumstances in the child's daily environment or in his past experience. For this reason it is important, in dealing with the child who appears to be emotionally maladjusted, to inquire as far as possible into his background. It is also important to help the child to overcome remediable weaknesses, to help him by degrees to acquire understanding of his emotions and competence and skill in coping with problems in his environment that cause anger by reason of his inability to solve them, or that cause fear by reason of his actual or imagined inability to deal with circumstances which he regards as a threat to his safety.

QUESTIONS AND EXERCISES

1. Make a list of the fears you recall from your own childhood and discuss this list in the light of the foregoing account of children's fears. To what extent do your own experiences confirm statements that have been set forth in this chapter? In what ways would you supplement or criticize the discussion in the light of your own experience?
2. On the basis of your own recollections, or on the basis of observation of children, give an account of factors that may be helpful in overcoming fear.
3. What details can you add to the description of indirect or disguised expressions of anger?
4. Give an example of the way in which a given circumstance at one stage of growth, or in one setting, might elicit one emotional response (such as fear) and in other circumstances might elicit another emotional response (such as anger).

5. On the basis of your own experience or observation of others, cite examples of (a) situations or events that aroused an emotional response at one stage of growth but had no such effect at a later stage; (b) situations or circumstances that produced no effect at an earlier stage of growth but did cause anger or fear or elation at a later stage.
6. A large proportion of the troubles or misfortunes that children and adults "worry" about never materialize; fears with respect to what *might happen* are far in excess of the misfortunes that actually do happen. Do you think there is any way in which this state of affairs could be avoided? To what extent is it likely that this seeming excess of fear actually helps to safeguard the individual against disaster?
7. Give an example from everyday life of the way in which animosity between two persons may be intensified by the tendency to make an angry response to another's anger.
8. What are some of the techniques that adults may use that may have the effect of disturbing a child's self-confidence or "sense of security" and thereby render him more susceptible to apprehensions of various kinds?
9. What is the psychological justification for the statement that "a soft answer turneth away wrath"?
10. A given class includes pupil A who is very bright and pupil B who is rather dull; what are some of the happenings during a school day that might be conducive to anger, or apprehension, or satisfaction in one of these children and which might elicit different emotional reactions in the other pupil?
11. What are some subtle practices that may give a pupil the impression that he is "rejected" or disliked by his teacher?
12. What are some concrete steps that a teacher might take to help a child who seems to be suffering from an abnormal degree of shyness?
13. How may the example of fearlessness displayed by another help a person in overcoming his own fear?
14. Keep a diary of your experiences of anger—ranging from mild annoyance, or irritation, or resentment to more intense states of anger (if any occur)—for two or three days (or as long as may be necessary to provide some records). Make a study of these episodes. What were the causes of anger (immediate causes as well as background or contributing causes)? How reasonable

do the episodes seem in retrospect? What information, if any, concerning the nature or value of anger, or concerning yourself, do these records offer? Such a record might also be kept of other emotional states, including fears, joys or pleasures, grief. If such a record is kept, examine it to find what is the relative frequency and intensity of pleasant as compared with unpleasant emotional reactions. It would be especially interesting to compare your records with those of others and to try to find reasons for differences and similarities in the records of different persons.

15. Modern life provides many conveniences, but many of these conveniences also complicate the business of living. What, in your opinion, are some of the occasions for anger or fear that prevail in connection with modern life, but that did not prevail in an earlier generation (say fifty years ago)?
16. Can you offer any evidence in favor of the statement that grief, melancholy, anger, or fear are sometimes satisfying?
17. Can you think of situations, under modern conditions, where a strong emotion would be of value?
18. What are some of the impulses that you have experienced when angry or frightened?
19. Is there any likelihood that a person can learn to control his emotions completely?
20. Can you trace in your own experience or that of others the gradual development of habits of emotional expression, such as habits of "feeling blue," of being easily irritated, of persistent cheerfulness?

CHAPTER V



DEVELOPMENT OF SOCIAL BEHAVIOR

The widening of a child's range of social activities parallels and is interwoven with other features of his growth. Many of the early signs of intellectual growth, for example, appear in connection with a child's response to other people, such as the development of the ability during the first month of life to distinguish between persons and other objects, the ability later to distinguish between the mother and other persons, between playful tones and gestures and other sounds and movements.

The interrelation of mental and social behavior is seen especially in the development of language, which involves intellectual symbols and also operates as a means of communicating with others. Even the mental processes involved in private thinking have a social orientation, for frequently in his thoughts a person is trying to formulate answers in such a manner that he can communicate them to others. As the individual argues with himself, in weighing and rejecting alternatives, he is, in effect, marshaling his logic (or rationalizations) in a manner that might convince other persons. In like manner, an individual's social and emotional behavior is interwoven in complex ways, so closely, indeed, that it is only by arbitrary definition that phenomena such as jealousy, shyness, stage fright, affection, and sympathy are treated predominantly as "social" or "emotional" forms of behavior.

Interrelation of "Socialization" and "Individualization."

The development of a person's behavior as a social creature proceeds apace with the development of his individuality, his status as an independent creature, distinct from others. Socialization and individualization are complementary features in the development of personality. As the young child progresses

in his ability to enter into social contacts, to participate with others in common projects, he progresses also in his ability to express his own private concerns, to assert himself, and to safeguard his privacy as a unique individual. Thus we see, for example, that in the period from about eighteen months to four years the child not only is advancing rapidly in his interest in group activity, in his ability to share, and to merge his activities with those of others, but he also is showing much behavior of a self-assertive variety, such as resistance, "negativism," hitting, and snatching. The latter as well as the former varieties of behavior are normal features of social development. The relative prominence of these forms of behavior will vary in different individuals and in the same individual from time to time. Although individual children may veer toward one extreme or the other, it has been noted that at the preschool level children who make the greatest number of social contacts of a friendly or neutral sort are also likely to be above average in the frequency of their resistant and combative behavior.¹

Advances in Group Behavior. Although there are no distinct stages of social development, it is possible to note certain general trends.

Awareness of others. As mentioned above, the young baby who at first plays a rather passive social role, begins during the first few months to make active social contacts by smiling, laughing, imitating sounds and gestures, calling attention to himself in various ways. His earliest social responses are directed primarily toward adults. It appears that the child has a special response to other persons. Sometime during the first two to six months he *smiles* at the approach of an animated human face in a manner that is different from his response to the approach of an inanimate object.²

Size and complexity of social group. He takes notice of other children during the first half year of life, but it is not until well into the second year that he is likely to play cooperatively for more than brief intervals with another child. Even at this age, and well along in the preschool period, the child will spend a good deal of time in watching or in semisolitary activ-

ity when with other children, and many of the social contacts that do occur will take the form of parallel action rather than a merger of individual activities in a common enterprise. From two years until the school age, there is an increase from year to year in the amount of time spent in joint action with other children when they are available. When circumstances permit, there is an increase also in the duration of social undertakings, in the size of the group, and in the complexity of the social unit.

Children of beginning school age are highly "socialized" creatures but, as noted earlier, they still are likely, when managing their own affairs, to operate in relatively small groups. A child at this age may form close ties with a few children within the larger grouping (such as his class at school) while many others remain on the periphery of his social world. A child is not unique in this respect, of course, for at no age level is a person likely to fraternize equally with all members of a class or community, but as he grows older he is better able to operate in larger groupings. In time he can even assume leadership, or act as a follower or participant and take an active interest in group enterprises that embrace the enrollment of an entire class, school, community, or state.

We have less systematic knowledge at the elementary than at the preschool level concerning the process through which children, as they grow older, become capable of group action on an increasing scale. One difficulty in obtaining authentic information is that the behavior of a group of children, at any given age, will be influenced by the adult who is in charge. However, certain broad lines of social development can be formulated.

Organized activities and teamwork. One such development is the increased interest and ability shown by children in organized activities and in teamwork, as distinguished from more loosely organized activity and a more individualistic type of play. The onset of what may be regarded as real teamwork has been set at about the age of ten years, but this must be regarded as approximate. One reason that we can speak of this

only in approximate terms is that behavior will vary according to the environment in which the children have lived; another reason is that teamwork is not a distinct pattern of behavior that suddenly emerges. As a matter of fact, there are rudiments of teamwork in the social play of children from the age of about two onward. Broadly speaking, however, a difference can be noted in a child's reaction to certain forms of social play. Furfey³ points out, for example, that "there is a time in a boy's life when team games become more interesting than individualistic play," when the life of the group assumes increased importance to him, and when he is eager to join clubs and gangs. Furfey points out that, according to his observations, a large proportion of boys have reached this development by the age of ten; but at the ten-year-level there are also many boys who still show behavior characteristic of an earlier age.

As an illustration of the more absorbing interest in teams at about this age, Furfey points out changes that boys frequently show in their participation in competitive games. At ten years, a boy who earlier, in a baseball game, seemed to be primarily interested in making a hit and being a star, without much regard for the score made by his "side," may now "rather play right field on the winning team than star for the losers."³

Other social trends. In the age range from two to six years and onward, for example, children acquire increased awareness of standards of performance as set by others. Associated with this advance there is an increase both in the child's competitive activities and in his capacity for judging his own performance in terms of a socially determined standard.

Boy-Girl Relationships. When children first begin to participate actively with their peers, boys and girls tend to play together on equal terms. During the preschool and early elementary school years, there is much play between the sexes, and unless customs are imposed by adults or older children, a boy or a girl is likely to show no hesitation about joining a group consisting mainly of members of the other sex, if no other children are available. However, even during the preschool

years, boys are likely to play more with boys, and girls with girls, if several children of both sexes are available.⁴

In the early and intermediate elementary school grades, this segregation becomes more noticeable. With the approach of puberty, on the other hand, children seek activities that can bring members of the opposite sex together.⁵

It has been noted in Chapter III that this increased interest in the opposite sex tends to occur somewhat earlier in girls than in boys. In the study (by Stolz) referred to above,⁶ it was found that girls developed on the average about one and one-half years ahead of boys, and it appeared, as far as the population involved in this study were concerned, ". . . that in the seventh or eighth grade you may find two-thirds of the girls in the pubertal cycle while two-thirds of the boys have not yet started upon it." Stolz found, in addition, that there may be a difference between two boys of as much as four years with respect to the onset of the pubertal cycle of growth changes, and there may be a variation of as much as three years in the time at which the cycle is completed.

Some shifts in standards of worth and of popularity may also occur at this period,⁷ although there is more likely to be a positive than a negative relationship between popularity before puberty and during or after puberty. The girl who is plump may become more self-conscious with respect to this condition than was earlier the case. The boy who still retains boyish physical characteristics while his peers are growing more "mannish" may find that attitudes of the boys toward him undergo a change. As time passes, the economic status or the social status of the child's home in the community may have an effect that was not so noticeable before. In the study referred to above, it was noted, for example, that for a girl to be a member of a wealthy family was more of an asset in being accepted socially at the end than at the beginning of the high school period.

Learning and Maturation as Related to the Emergence of Social Responses. Since social behavior consists of response to other persons, it is inevitable that such behavior will be in-

fluenced largely by the social environment in which the child lives. However, the outcropping of certain forms of social behavior, and the sequence in which various social responses emerge, is not dependent upon the external environment alone. The effect of similar environmental circumstances varies as the child matures.

Changing Social Response. An example of this was noted in the account of shyness in the preceding chapter. Another study that bears upon this point is a study, earlier referred to, of two infants who from the time of birth to the age of seven months were kept in a highly restricted environment.⁸ Although their attendants refrained from smiling to them, these babies, in due time, smiled and laughed and showed what seemed to be signs of affection in response to other persons. It appears that these forms of behavior emerged with little stimulation from others.

In like manner, the way in which a child responds to special provisions in the social environment will vary as he matures. If, for example, we take two similar two-year-old children and provide one with the company of several other children, while the other is completely deprived, of the company of other children, it is likely that the former, during the period of the experiment, will acquire many techniques of social intercourse that the latter does not possess.

However, the behavior shown by this "socialized" two-year-old will consist of an elaboration of social behavior that is characteristic of normal two-year-olds rather than characteristic of normal four- or five-year-olds. The fact that what a child learns will be relative to his level of maturity appears in a study of nursery school children who were about three years old in which comparisons were made between youngsters who had previously attended nursery school for one or two years and others who had never previously attended.⁹ At the beginning of the school year, the veterans showed more social activity than did the new children. But during the ensuing weeks, the new children rapidly closed the gap, so that at the end of the school year there was no appreciable difference between the two groups in the number or quality of their social contacts.

The outcome might, of course, have been different if the "new" children had previously been denied all contact with other children, whether in or out of school, but this does not obviate the findings as far as they go.

The fact that a child's response to the social environment changes as he matures does not, however, mean that the mere fact of growing older will necessarily bring about a steady or rounded advance in social adjustments to other persons. A child of six or eight who has been limited largely to contacts with adults, may be quite adept in his social relations with adults and yet be quite ineffectual in his dealings with other children. Again, an individual's social adjustments may be quite specific to a given situation or set of circumstances; he may be "sociable" and self-possessed in one group and quite the opposite in another. Further, when confronted with a new situation he may for a time revert, in part, to earlier forms of social response. With a strange group, he may resort, for example, to "onlooker" behavior, somewhat resembling the behavior of a two-year-old who is in a group but not of it. However, it is likely that there will be a good deal of carry-over from one situation to another. It is likely that children who have attended kindergarten adjust more readily, at the start, to the social situation in the first grade than children who up until then have had little regular association with their peers.

Influence of the Culture on Social Behavior. At any age level, likewise, a child's social behavior will be markedly influenced by the culture and customs that surround him. This can be seen, for example, in the difference between the make-believe play of children who live in much the same culture but come from homes where customs differ: in a group of day nursery children from relatively poor homes one may find, for example, certain patterns of behavior, such as a common practice of spanking the doll (or the child who plays the part of the baby), or the enactment of household duties (such as doing the weekly wash) that do not appear so prominently, if at all, in the play of children from more privileged homes.

The effect of the customs of his elders on a child's conduct

at an early age is shown in a report of a study of two preschool groups in Russia. The children in one group came from homes in which the parents had adopted the "new" mode of life brought about by the revolution; the parents of the other group lived in a community that retained more features of the "old" mode of life. The "old" modes of life were reflected in 49 per cent of the games of the latter group, and in only about 6 per cent of the games of the former. The play of the children from homes with "newer" ways of living included features such as the communal household, and games depicting the revolution.¹⁰ It is likely that when differences such as these appear in the framework of children's games, there still would be a high degree of similarity in other respects, such as the frequency of conflicts, evidences of friendship, leadership, sympathy, and competition, but results such as these still emphasize the manner in which children absorb social forms that have been adopted by their elders. These observations also suggest how it is that ways of behaving that people of one generation have adopted by choice or necessity come to be accepted as the "natural" mode of life and pass from this generation to the next.

Social Behavior in Relation to Socioeconomic Status. *Differences in Customs.* Even within a community where people share the same institutions there may be notable differences in the customs and standards of different groups within the community.¹¹ Depending largely upon the socioeconomic position of his family there are differences in the extent to which the child's home has facilities such as a telephone, an automobile, separate rooms (or at least separate beds) for each child in the family, a playroom, a varied supply of books, and so on. There are differences also in the extent to which children are required to do chores, to take care of their own needs, to take responsibility for younger children. There also are variations in standards of cleanliness and modesty.

A child of low socioeconomic status may be seriously handicapped in his social relationships if, for example, he is ashamed of his clothing or uncertain of his manners, or if he is not in-

vited to the homes of other children or if he is ashamed to invite others to his home. The differences in the customs and standards of different socioeconomic groups do not, however, show a consistent pattern, and they are not uniformly disadvantageous to the person of lower status. In some "lower" groups the methods of child-rearing may be more "natural" and less frustrating;¹² this, one might assume, would be the case if, say, the mothers generally nurse their children, or do not hasten to wean them, do not hurry to established bladder control, do not become disturbed if they are dirty much of the time, permit them a good deal of freedom to rove when they are able to get about by themselves.

On the other hand, this tendency to be more "natural," less exacting, does not appear uniformly in the customs of persons of lower socioeconomic status. Their ideas of modesty may be very rigid. Moreover, children of lower socioeconomic status will not always learn to take care of themselves at an earlier age, or acquire more domestic skills, than children of higher status, for parents in poor circumstances sometimes deny themselves to spare their children from what they regard as menial or common kinds of work. A child so brought up is perhaps in an especially difficult position, for he is bound to realize in time that his circumstances are rather humble and yet he will be lacking in the very skills and practical resourcefulness that are especially valuable to a person in his circumstances.

Differences in moral standards. Apart from differences in details of conduct such as those mentioned above, there may also be differences in moral standards. In studies of some groups, it has been found that children of lower socioeconomic status (which includes educational status of the children's parents) tend to be somewhat more authoritarian and punitive in their attitude toward certain forms of socially disapproved behavior. In one such study children from homes of lower status tended more often than children of higher status to regard cheating as something naughty in itself (rather than, say, as something wrong because it is unfair to the other fellow or because one cannot really learn that way). Similarly, children

of lower status, more often than children of higher status, expressed the judgment that a child who had broken another child's toy should be smacked; children in the latter group more frequently maintained that the youngster should make amends to the injured child.¹³

In like manner, in another study¹⁴ children of lower socioeconomic status more frequently recommended a "nonconstructive" approach, such as scolding and punishing, when prescribing what to do about a youngster who interferes with other children or steals their marbles. More children in the upper than in the lower groups sought ways of excusing the wrongdoer's behavior or of helping him to satisfy his wish for marbles in an honest fashion. In another study (Stendler)¹⁵ it was observed that children in a poor neighborhood did not disapprove, as much as did children in better circumstances, acts such as damaging public property (picking flowers in a park when signs forbid it) or taking gum that has spilled from an overturned truck.

Importance of an understanding of socioeconomic differences. These findings indicate ways in which groups might differ; they are not cited as evidence that such differences will be typical in all communities. It should also be noted that there are wide variations within any group, regardless as to how much the most representative member of this group differs from members of other groups. However, in many teaching situations it is important to be aware that such differences may prevail. If there is a difference in standards and values between a teacher and his group, the words that he uses, the rules and ideals he takes for granted, will not have the same meaning to others as they have for him. Moreover, understanding of a difference in customs is a help in interpreting the behavior of another. It is a more radically serious symptom of an antisocial attitude, for example, if a youngster shows behavior that is repugnant and unthinkable according to the standards of his group (such as carrying a knife for use in fights with other people) than if the same behavior is shown by a youngster in a group where he sees many persons use this practice

It is helpful in dealing with children to be aware of differences in group standards and customs whether or not these happen to be linked to socioeconomic status. It is especially important for an adult to try to understand children whose background differs from his own. The values, customs, and tastes of one's own group sometimes are taken so much for granted that one fails to appreciate, much less to sympathize with, a person schooled in a different social setting. It is easy for a person reared in moderately favorable circumstances to adopt a "What-else-can-you-expect" attitude toward a child from a poor home who happens to be shiftless; likewise a person who has had quite a struggle to earn his way may fail to realize that the problems of a wealthy child, although they differ from his own, may be just as severe. The need to be on the alert against a tendency to misjudge or to ignore the plight of the person with a background differing from one's own is perhaps even more pressing in relations between people differing in color, race, or nationality, than in the relations between people who happen to differ only in socioeconomic status.

PARALLELS BETWEEN

SOCIAL AND INTELLECTUAL DEVELOPMENT

While it is well to recognize that there may be psychological differences between groups differing in socioeconomic status it should also be recognized that the psychological environment in which two children live may be quite different even though their socioeconomic environment is much the same. Two youngsters may similarly live in rich or poor circumstances and yet one may live in a home where the psychological climate is warm and friendly, while the other lives in a home where there is much friction and bad feeling.

Interrelationships between intellectual development and social behavior, alluded to in earlier paragraphs, are not only of interest in themselves but also have implications for the education of children. This holds true notably in connection with what is known as the "social studies" in the elementary and high school grades. As noted earlier, it is not until the child is

well along in the elementary school grades that he normally is capable of actively identifying himself with a large group, or of joining effectively in complex forms of teamwork (unless directed by an older person). A similar trend appears in children's intellectual interests relating to other persons or to social affairs. A study of children's contributions during free discussions in the classroom (see Table VII, page 185) shows that from the second to the sixth grade level there was a sharp increase (from 18 to 60 per cent) in contributions relating to "current happenings" in which the children were not directly involved.

There also is an increase with age in the ability to do what might be called intellectual teamwork: in the second grade, 87 per cent of the contributions made by the children were in the nature of "new topics," that is, what the child said bore little or no relationship to what was said by preceding speakers. In the sixth grade, on the other hand, only 23 per cent of the contributions were of this nature, while a considerably larger proportion conformed to the theme or topic that others had been discussing. The implications of this study for students of education will be considered in more detail in a later chapter.

INDIVIDUAL DIFFERENCES IN SOCIAL RESPONSE

From early infancy onward individuals show marked differences with respect to various features of social behavior.¹⁶ During the first year of life, children differ notably in the extent to which they are "outgoing" or responsive to other persons, in their display of shyness, their apparent sensitivity to the behavior of others, their readiness to laugh and to initiate games with other persons (such as simple versions of peek-a-boo). During the second year and throughout the preschool range, children likewise show large differences in displays of resistance, aggressiveness, and sympathy, in the extent to which they enter into social contacts with other children, in their resourcefulness in dealing with others, and in the many complex characteristics that make for their acceptance as friends or leaders in a group. Wide differences can, of course, also be noted throughout the elementary, high school, and later years.

Factors Underlying Differences in Social Behavior. Factors underlying such differences, and the process by which they come to the fore, have not been explored by psychologists as well as one could wish. One reason, among others, is that the factors, whatever they may be, are so complex that they are hard to weigh or identify. In theory, at least, it would not be difficult to argue that all such differences are due to environmental factors. Simply on the basis of everyday observation of young children in their homes, and of the marked differences in the manner in which their elders manage them, one can readily conceive that children eventually might come to differ in their tendency to be sociable, jolly, and playful, or dour, aggressive, and resistant. On the other hand, it can also be observed that children show wide differences in their early social behavior even when there are no apparently marked differences in the environment. Even during the first few months of life one may find marked differences between infants in nurseries that house babies who have been institutionalized from the time of birth, who are under the care of the same attendants day after day, whose daily routine is more systematized than is the case in the usual home, and who similarly receive less individual attention than do home babies. In such a situation, one child from the time when he is only a few weeks old, characteristically gives a heartier response to other persons than does another as he fixes them with his eyes, follows their movements even when they are attending to other infants, laughs and smiles and babbles to attract attention. Such differences suggest that inborn factors are partly responsible. But it is true, of course, that even though the external environment may seem quite similar for all children, there still may be subtle differences in the treatment received by individual children.*

To ascertain the influence of hereditary factors on differences in social behavior is hardly possible. One reason is that behavior such as sociability, or a tendency to be sympathetic, or to be aggressive, is very complex and cannot be identified

* For evidence provided by the Dionne quintuplets see comments at the end of the chapter 17.

in the manner, say, that one can identify a child's skin color and attribute his white or black skin to heredity. Another reason is that hereditary and environmental factors are interwoven and complementary rather than easily isolated and distinguished.

Quite apart from the factors that originally made a child differ from another in his response to other persons, the behavior that he now shows will have some effect on others and thus, reciprocally, influence his own conduct. During the first months of life one child may, for one reason or another, show an unusual amount of interest in other people. His parents may cater to this interest and, with the passing months, arrange for him to meet many persons, children as well as adults, in the home and on visits to neighbors and on shopping trips. In this way, the child will obtain more opportunity to meet and fraternize with people than would a child who happened to be rather fretful when he first began to notice strangers, and who had little inclination to attract the attention of unfamiliar persons. In like manner, a child who, for one reason or another, tends to show an uncommon amount of resistance or stubbornness in his first run-about contacts with other children may provoke counter-resistance in others and this, in turn, might aggravate his own resistance. Analogies to this can also be observed in later childhood and in adult years. At a certain time, a person may be noticed by reason of some pleasant quality he displays and thereafter further opportunities for exercising this quality may be placed in his way. Thus, a person who happened to make a happy turn of phrase in a speech may repeatedly be asked to speak again with the result that through long experience he has a chance to improve upon his art, while other potential orators remain silent and unrecognized.

Actually, of course, human behavior is not governed by formulas quite as simple as this, but it is possible, through everyday observation, to note how a child's behavior not only is influenced by his environment but also has an influence upon his environment. He is a creature of his environment but he also has a hand in creating his environment.

Educational Implications of Individual Differences in the Pattern of Social Behavior. In the foregoing we have noted that individuals differ decidedly with respect to this or that form of social behavior. One person may be conspicuously aggressive, another conspicuously unaggressive. Further, a person may be very aggressive and also conspicuously sympathetic, while another is similarly aggressive but is seldom sympathetic. There are wide variations, both with respect to any given form of behavior and also with respect to the ways in which various forms of behavior go together in the same individual. This fact has definite educational implications.

For one thing, it is impossible to describe what might be regarded as ideal social adjustment or an ideal combination of characteristics. It is true that certain forms of behavior may prevail to such a degree that they represent a handicap or a form of maladjustment. Thus, a person who is shy may be maladjusted. However, even shyness, as such, cannot be regarded as a form of maladjustment. Nor does the behavior of a sociable, hail fellow well-met individual necessarily represent a model type. By virtue of other characteristics, the child who seems shy and given to solitary behavior may actually be better adjusted than his gregarious neighbor. He may be quite content with a small amount of social intercourse. He may have more absorbing interests, and make more constructive use of his time and abilities, than the person who habitually runs with the herd and always tries to make a splash when two or three people are gathered together.

Moreover, a form of behavior which seems, for the time being, to be a handicap may arise by reason of other characteristics that eventually will be an asset. An example of this appears in the case of a child, alluded to elsewhere in this chapter, who was somewhat of a social outcast in the nursery school but who proved to be popular in the elementary grades. This child had intellectual interests and abilities which were not appreciated by the younger children, but which were appreciated, and served as a means of establishing enjoyable social relations, at a later age.

The foregoing does not mean, of course, that there is no room for guidance, or that a complete policy of hands off should be observed in the education of children. It does mean, however, that teachers and guidance specialists should be wary of setting up a preconceived model or standard. Each aspect of a child's behavior should be viewed in the light of the larger pattern of his conduct as a whole. His assets and liabilities cannot be appraised simply by examining now this, now that, isolated feature of his behavior. Thus aggressive behavior, such as hitting when interfered with, may be a good sign, if, for example, he hitherto has been pushed around too much by other children and is now asserting himself in the process of gaining the respect of other children. But the same aggressive act may, when viewed in the light of the total behavior of another child, be a symptom of a tendency to be destructive and hostile. Moreover, if it seems advisable to try to change a child's behavior, the only procedure that will work (short of rigid coercion) will be one that operates in terms of what the child already is and the resources which he already has, rather than in terms of a preconceived standard.

Consistency and Change in Social Behavior. In studies of young children it has been found that youngsters tend, on the whole, to show a high degree of consistency in their predominant characteristics. In one study¹⁸ of twenty-five babies who were closely observed from the time they were born to the age of two, it was noted that each child showed characteristics that distinguished him from others. The babies showed a high degree of constancy with respect to their distinctive characteristics from month to month. There were, of course, shifts in behavior as the children grew older. One child, for example, showed a continuing underlying tendency to be timorous or shy, but the outward manifestations of this trait varied as he grew older.

In another investigation,¹⁹ an intensive study was made of sixteen children from the time they were two or three years old until the time they reached the second or third grade (aged eight or nine years). This study deserves special notice even

though (as the author points out) it was limited in scope and should be supplemented by more intensive studies of a larger number of children in a wider range of circumstances. On the basis of information concerning the social behavior of the youngsters at the preschool level, it was found possible roughly to classify the children into four groups. One group included children whose most conspicuous or predominant form of behavior seemed to be that of *withdrawal*; another group included children who could be described as predominantly *conforming* (in a constructive and apparently well-adjusted manner); another group included youngsters described as *invasive* (that is, disposed to proceed rather aggressively and in a somewhat roughshod manner in their dealings with other individuals); a fourth group included children who were conspicuously *cautious* (unlike the *withdrawing* children, these youngsters were sensitive to social situations but seemed to be inhibited or to lack facility for plunging freely into social contacts). Quite obviously, no child was a "pure" type: each child whose behavior fell predominantly into one of these categories also sometimes showed behavior resembling that of children in each of the other categories.

During the period of six years covered by this study, many efforts were made to guide or to change several of the children in this group. In a few instances, such efforts seemed to produce changes in the desired direction. However, in several instances the children continued to show substantially the same basic style of behavior throughout the entire period, regardless of adult efforts to produce a change. According to the school records, information and ratings supplied by the teachers, and data obtained through independent observation, ten of the sixteen children remained in the same grouping throughout this period of years. Even so, details of the children's behavior had changed: a child, for example, who was predominantly cautious would use different techniques for limiting social contacts at the age of eight than he used at the age of two.

The fact that some children did seem to change substantially is, of course, also quite noteworthy. The children who did seem

to "change," did so, it appeared, through a process of building up and strengthening characteristics and resources which they had exhibited to a lesser degree when they were younger. Moreover, guidance, when successful, consisted primarily in "building upon" assets that already were there. In the case of children who seemed to change without intensive guidance, the changes apparently occurred by virtue of the fact that the child seemed to have found the opportunity or the incentive to exhibit more prominently certain characteristics and abilities (whether favorable or unfavorable) which he had exhibited in his own unique way at an earlier age. It was also noted, incidentally, that efforts to bring about a change in behavior at school seemed to be least successful with children whose parents had views concerning the proper training of children that differed from the views held by the teachers.

RELATIVE POTENCY OF "POSITIVE" AND "NEGATIVE" SOCIAL RESPONSES

Is it more likely that a child, of his own accord, will try to promote his own interests at the expense of others, and that he will tend to be resistant and aggressive rather than friendly, sympathetic, and cooperative? This manner of putting the question oversimplifies matters, but the question is of some interest, for arguments as to what we can count on in "human nature" often are raised by optimists and pessimists alike in connection with the planning of educational programs and schemes for human betterment. The answer to this question has been anticipated above. None of these presumably contrasting forms of behavior can be regarded as more "natural" or more "built in" than any of the others. The helpless infant demands much and gives little, but even during the first few months of life he meets the world part way with friendly smiles, laughter, and playfulness. As he grows older, his demands continue, but he gives as well as takes; he resists his parents and teachers, but he also complies in countless ways. In dealings with other children he snatches and he shares; he shows both aggression and friendliness; he competes but he also cooperates.

By reason of the inconvenience caused by resistance, fighting, and disregard for the rights of others, these forms of behavior sometimes seem to predominate when actually they do not.

Since children are under pressure from an early age to inhibit unfriendly behavior, and since the motives underlying their behavior often are mixed, the relative strength of friendly and unfriendly impulses cannot be measured simply by counting the frequency of separate acts; yet such tallies are instructive as far as they go. In one study (by Mengert)²⁰ two-year-old children were observed when paired with one another in an experimental situation. It was found that overtly friendly acts outnumbered overtly unfriendly acts in the ratio of more than four to one. In studies of the behavior of preschool children at home and in nursery school situations, it likewise has been found that activities involving friendly or neutral give-and-take quite outnumber aggressive acts, such as hitting, holding, snatching, or quarrelsome interchanges by means of words.²¹ In studies of grade-school children in classrooms that permitted a good deal of freedom, it has been found that friendly and helpful interchanges tend, by far, to outnumber instances of hostile criticism or other forms of unfriendliness.²² This ratio will vary, of course, with different children and in different situations, but a close examination of the details of the behavior of individuals who even have earned the reputation of being "antisocial" is likely to reveal a large amount of behavior of a friendly and cooperative sort. In helping such individuals it is useful to try to recognize and to build upon these positive features.

The sections immediately following will deal briefly with some of the forms of social behavior that have been mentioned above.

SYMPATHY

The capacity for sympathy, for "suffering with" others who are in distress and being responsive to another's joys, is very important for individual adjustment and for the welfare of society. All children no doubt have potentialities for develop-

ing fellow-feeling of this sort to some degree, but the manner in which such feelings will be aroused and the extent to which they will be expressed in appropriate action depend upon many factors in the child's environment and in his own emotional adjustments. In order genuinely to sympathize with a person who is in distress, a person must have undergone similar experiences of his own, at least to some degree; he must have sufficient mental maturity to be able to perceive that the other person is affected; and eventually he must learn, through his own direct experience or through example and instruction, how to express his sympathies effectively.

Infants will sometimes cry when they hear others cry, but it is questionable whether this is an expression of sympathy. In a study of the sympathetic behavior of young children, Murphy²³ found that two- and three-year-old children did not generally recognize such evidences of possible distress as black and blue bruises, or being crippled. They might respond to conspicuous bandages, for example, but show no response to a swollen arm. As children grow older they become able to recognize such signs as well as some of the obvious symptoms of another's feelings and to appreciate situations that may give rise to sorrow or joy in another even when no emotion is expressed.

Individual Differences in the Tendency to Sympathize. Individuals differ decidedly in their tendency to be sympathetic. An individual who in other respects shows good intelligence may be quite blind to many distress situations and appear to be quite callous. Moreover, at the adult level as in childhood, a person is likely to be more sympathetic toward someone close at hand than to persons who are more remote from him. It is quite understandable that this should be so, yet a person's lack of sensitivity to the plight of distant people can work to his disadvantage: a condition that causes suffering to people far away may lead to political upheavals and eventually to a war which overnight can involve the world. An individual is less likely to be sympathetic if he is responsible, or may be blamed, for another's distress, or if an expression of sympathy would clash with his own self-interest. If an individual himself

has suffered much or is in distress at the time he will better be able to appreciate the plight of the other person. However, he may be so absorbed in his own misfortunes, or glory so much in his ailments, that he is unmoved by the other's difficulties. Sometimes he may even welcome company in his misery. He may find his own distress easier to bear after viewing the misfortunes of others.

Factors in the Cultivation of Sympathy. An important problem in education, on which there is little systematic information, is how best to cultivate intelligent sympathy. There are no simple rules that can be applied, for an individual's disposition to sympathize will be influenced by countless factors, including the unique pattern of his own emotional and social adjustments. As in moral training, the example set by his elders is likely to have more effect than their precepts. Most difficult to acquire is the practical realization that the other fellow has sensitivities similar to one's own. Frequently it would be a matter of self-interest to have this realization (in coping with an angry person, for example, a moment's effort to try to appreciate his feelings and the reasons for them will often accomplish more than bitter counterattacks), but it is blocked by competing impulses. There are occasions, however, when attitudes toward another can be influenced by reminders, such as the suggestion that a child who is being ignored or persecuted by his fellows is afraid and feels badly, or that a youngster who displays aggressive mannerisms actually would like to make friends but does not know how. Moreover, anything that helps a child to be free of anger or fear or a chronic tendency to compete in dealings with other people, is likely also to leave him freer to develop his capacity for sympathizing with others.

FRIENDSHIP

From the time when a child is able to have active social dealings with others he is likely to show preferences. At the age of two and onward, strong friendships between children may be established and these may persist over a period of months or even years.

Factors Influencing Choice of Friends. As a child grows older, changing abilities and pastimes, changes in his private interests and social adjustments, and differences in the individual growth pattern, may bring about notable shifts in a child's choice of companions. A child who is a newcomer at school or camp may make friends with one of the more timid members of the group and then develop other ties as he comes to feel more at home. A friendship dominated by one member may founder when the dominated person comes into his own. School projects may bring out latent intellectual or motor abilities that lead a child to seek new associates. Friends of the same or opposite sex at adolescence may draw apart if one remains relatively static in his development while the other continues to grow in mental power and emotional maturity.

Friends are likely to show a higher resemblance than non-friends in such characteristics as height, weight, intelligence, honesty, progress in school, motor ability and the like. These resemblances are not so pronounced, however, that the origin of friendships can be accounted for on the basis of any one of these items. The factor of nearness in space plays an important role, for a person is almost compelled to choose his friends among those who are spatially or occupationally near to him in everyday life. This factor of propinquity alone does not, however, account for the selections that are made from among those who are near at hand.²¹ More difficult to fathom are the subtle factors of temperament and personality that draw people to one another in various relationships of friendship. One individual may characteristically seek companionships in which he is the dominant or the submissive member, while another occupies a variety of roles in his relations with his friends. One may establish a semblance of friendship for ulterior purposes, while another is characteristically more genuine.

Affinities between Members of a Group. Any social group is likely to present a highly complex structure when examined from the point of view of the popularity of its members and the affinities between different individuals. Information concerning these relationships often is quite revealing and may have

practical value for those who are responsible for the group. One procedure that can be used in many situations to obtain information is simply to record the behavior of individual members, to note instances of ignoring, hostility, friendliness, and the like, in the relations of various persons. Another procedure (involving the use of what are called "sociometric techniques")²⁵ consists in having the members of a group express their preferences. For example, the members of a class may be asked to list the names of pupils whom they would like to have as seatmates or as neighbors at their desks. In an institution or in camp, the individuals might list the persons whom they would like to have seated with them at table or whom they would like as cottage mates. In more general terms, individuals may be asked to list two or more persons whom they would best like to have as teammates, as picnic companions, or as everyday friends.

A collection of such reports from all the members of a group may reveal interesting things. The choices may reveal that the group as a whole is only a formal aggregation that includes several cliques or coteries that have little in common, or the lines of choice may ramify throughout the entire group. It may be found that there are individual children on whom a large number of choices are centered, while other children are definitely on the periphery and are seldom selected, if at all; and that individual members make choices that are reciprocated, while others reach out for individuals who do not want them.

Such information, in turn, can be made the point of departure for studying the characteristics of individual members with a view of guidance, and sometimes they may be used as the basis for changing the practical arrangements in the group situation. The method of direct observation or the sociometric procedures described above sometimes can profitably be reapplied at intervals to appraise the progress of individual members, or to check upon whether a program designed to promote good social relationships is making any headway.

RESISTANT AND AGGRESSIVE BEHAVIOR

Early Signs of Resistance. Resistance to adult attentions appears during the first months of life in the form of stiffening of the limbs, averting the head when the face is to be cleansed, and so forth. As the child grows older, his resistance frequently takes the form of noncompliance with understood requests, and various acts of disobedience and stubbornness.²⁶ It may take an extreme form of negativism so that the individual goes out of his way to do just the opposite of what is wanted, even to his own discomfort, as when a child goes on a hunger strike.

Functions and Provocations. Resistance serves the child as a means of exploring in social relationships and of asserting and testing his own powers. Apart from this, provocations to resistant behavior are inevitable in connection with the young child's daily routine of washing, feeding, and dressing, in the delays that arise in meeting his demands, and in the steps that are taken to safeguard him from harm, as when he is held back to prevent a fall. Parents differ, to be sure, in their ability to circumvent and to handle such situations, but occasions when the child is thwarted for reasons that he cannot fully understand, and which therefore strike him as a form of opposition, will arise no matter how nimble his parents are.

Resistance is frequently brought about by demands that the child is unable to meet, but often it springs less from lack of ability to do than from lack of inclination. In one study (by Rust)²⁷ it was found that many of the items in mental tests that were resisted (in the form of refusal to try, silence, and so forth) were items that the children were unable to handle, as shown by their failure on later trials after their cooperation had been won; but they succeeded on 58 per cent of the items that were resisted on first presentation. In everyday life it is possible that instances of resistance when the child is actually able to perform would be larger than this. A measure of this sort would be difficult to obtain, however, since resistance frequently arises in response to demands that separately present no great difficulty but cumulatively tax a child's patience and endurance.

Changes Associated with Age. The peak of the more overt forms of resistance usually is reached by about the age of four, but resistance in one form or another persists throughout life. Some children show a period of intensified resistance at about the time of puberty when they are striking out for independence in new ways.

Normally, as a person grows older he learns more and more to conform to certain demands, to avoid disliked situations, and when issues arise, either to keep silent or to state his objections in an unemotional or indirect way. However, at the adult level one can sometimes observe behavior such as quibbling, contentiousness, efforts to obstruct or to respond negatively on inconsequential issues in a manner that resembles the resistance of a small child.

Aggressive Behavior. There is a good deal of overlapping between resistant and aggressive forms of behavior. The latter involve opposition to others coupled with a disposition to attack. Aggressive behavior can be observed in children's response while angry during infancy and in later years. It can also be noted in their fighting and bickering with one another, in the countless more or less subtle forms of attack exhibited by older children and adults. In the play of preschool children fracas in the form of snatching one another's material, hitting, interference with one another's person or possessions, verbal rejoinders of various kinds, occur quite frequently (once every five to eight minutes, on the average, in the behavior of children in three nursery schools that were included in one study),²⁸ but most of such combats last only a few seconds.

Varying Functions and Motives Involved in Aggressive Behavior. Acts that seem to be aggressive may spring from a variety of motives and serve different functions. They may be brought about by accidental bumps, they may be a form of experimentation to discover what the other child will do, they may be in support of a desire for another's possessions, they may represent a deliberate intention to hurt the other person. Sometimes a child, like an older person, will expose himself to a minor criticism or affront in order that he may counter-

attack.* If resentment already prevails it usually is not difficult to find an excuse for hostile action. Again, as noted earlier, combative activities may represent a temporarily wholesome form of behavior, as in the case of a child who previously has been dominated by one of his playmates but now asserts his independence while reaching out for friendly contacts with other children; or they may increase a child's difficulties.

Decline with Age in Overt Expressions of Aggression. As individuals grow older physical attacks give way to more polite forms of aggression. But attacks by way of innuendo, criticism, indirect attacks on an individual's reputation, gossip, criticism of another's ideas, jokes at another's expense, laughter when another is hurt, and so forth, may be more damaging than the straightforward combats of an earlier day. Usually this shift to more subtle techniques is more pronounced in an individual's dealings with casual associates than with members of his own family. Brothers and sisters frequently stage fine fights and quarrels after they have reached the stage of nonviolence in their dealing with people outside the home, just as well-adjusted husbands and wives feel free to snap at one another on occasion. Parents (and visitors) frequently overestimate the significance of such altercations and judge that they represent more deep-seated hostility than actually prevails. Apart from the fact that there usually is a greater degree of informality in the home than outside, there is also the fact that individuals who spend the most time together have the most frequent opportunity to interfere with each other and so they are likely to bicker at times even when their affection for each other quite outweighs their hostility.

The fact that "mutual friends are also the greatest mutual quarrelers," as was found in one study (by Green)²⁹ of young children, does not necessarily mean that chronically incompat-

* Children quite early recognize that unprovoked aggression is frowned upon and devise dodges to circumvent this rule or to excuse their conduct. The claim, "He hit me first," or "He started it" is frequently used. A version of this need for a verbal excuse can be seen in the "favorite joke" reported by a twelve-year-old child, as follows: Mother: "So you have been fighting again. How did it start?" Son: "By John hitting me back."

ible sentiments of love and hate exist side by side, although such confusion may prevail in a neurotic individual.

COMPETITION

Competition for Affection Within the Home. The circumstances that provoke competition change with an individual's expanding interests as he moves from childhood into mature years. The child's first notice of a rival is likely to come in the home, where he may be jealous of the attention shown by parents toward other children or toward each other. Jealousy is a response to a real or imagined threat to the security of one's position in the affection of others, and a reaction against anyone who threatens to win or to withhold satisfactions that are desired for oneself. Involved in the response may be feelings of anger, fear, and grief. All children are likely to experience jealousy to some degree. Numerous conditions may aggravate the response, such as extreme favoritism, unfavorable comparisons, loss of attention at the coming of another child, inferiority in coping with a younger and brighter child, as well as other factors that make for insecurity, such as dissension between parents.

Competition for Achievement and Prestige. Expressions of rivalry between unrelated children, in matters of size, strength, prestige, achievement, begin to appear as soon as children enter into active social contacts with one another. Most children will try to compete with the performance of others in one way or another by the time they reach school age.³⁰ During the elementary school years, competition continues to flourish, as it does throughout life. In the school grades, a child in our culture is likely to exert himself more when competing with others for individual honors than when working for a group award. He is likely, however, to exert himself more when working with a group of his own choosing than when assigned arbitrarily to work with those selected for him. Moreover, the strength of competitive as distinguished from cooperative pressures will vary in different situations and with different children.

Precipitating Conditions. Competitiveness, a desire to win for the sake of winning, and deep feelings of chagrin in response to failure in such competition, may be aggravated by parents who seek to realize their own ambitions through their children. Prizes, grading systems, school marks, also remind an individual of his competitive status. However, the role played by the school in promoting competition is perhaps small compared with the influence of other factors. In their play and out-of-school enterprises, children match their strength and skill, they come to recognize varying degrees of popularity and prestige, and receive frequent reminders of how they compare with others. Even in a school that has abandoned the practice of labeling the grades by number, putting marks on classwork or on report cards, and the use of stars, prizes, and honor rolls on the blackboard, the children are likely to realize about where they stand, and instead of competing for marks many of the children are likely to compete for other forms of recognition.

Values of Competition. While competition may involve the child in bitter struggles that have no value, it may also, on the other hand, add zest to many duties that otherwise would be boring. A child will sometimes even try to compete with himself, matching one shooter against another at marbles, playing one set of horseshoes against another, and so forth. It also gives the individual a standard to emulate and thereby spurs him to greater heights of enjoyable skill. In many situations one cooperates through joining in competition (as in most outdoor games) and in others one competes in cooperative ventures (as when the members of an organization vie with each other to turn out more and better work). An enterprising person can compete or cooperate or do both at the same time as the occasion demands. As against this, it should be noted that the joy of life may be lost, and much misery may be added, if a person becomes obsessed with the importance of outdoing others.

From an educational point of view, the proper attitude toward competition is not to deplore it on general principles, nor to try to stamp it out by grudging rewards to those who are deserving, nor by placing a handicap on those best able to

achieve. The practical attitude, rather, should be to turn competitive impulses into the most constructive channels; to avoid emphasis on ulterior or artificial rewards; to provide each individual as far as possible with opportunities that are commensurate with his abilities; to provide opportunities for children with differing types and degrees of ability to have a taste of achievement; to prevent inequalities in the rewards for useful service; and to avoid a policy of continually placing children in competitive situations in which they are bound to fail.

LEADERSHIP

Forms of Leadership. The beginnings of leadership of a sort can be found in the behavior of young children when they first begin to fraternize with one another. From an early age a variety of forms of leadership can be observed. At the pre-school level a child may exercise authority by means of dominating techniques, such as pushing the other child about, directing where he shall stand and what he shall do, allotting to him certain toys and withholding others. Leadership gained through domination of this sort is usually short-lived unless the dictator is very clever or strong. In another situation, a child may take the lead without imposing his will on others, but through his ability to initiate activities that attract other children by offering interesting suggestions that others like to adopt. Among older persons the leader may be one who has struggled ambitiously to win his position or he may be one who falls easily into the role.

During early years, as at later ages, the leader is not always the one who is out in front, giving directions or serving as a mouthpiece for his followers. Instead, he may be one who offers quiet comments that others seize upon and adopt as their own, and he may even appoint a titular leader (such as the conductor of the bus in the make-believe play of young children) while he selects what looks like a minor role.

Factors Influencing Shifting Roles. At an early age as at later levels leadership does not simply depend upon the qualities of the leader; it depends also upon the characteristics of

the led and the conditions that prevail at a given time. When hard pressed, children, like adults, may accept someone whom they would not accept at other times as a leader. After having a baseball game, for example, a group of youngsters might elect a leader who is not ordinarily very popular but who happens to make a good captain in baseball.

A child who assumes direction over certain children may have little voice in the affairs of another group that represents different interests and abilities. Again, a child who already is initiated into the operations of a school or camp may take the lead for a time over newcomers and then lose his influence as the others learn their way about. In a situation that calls for capabilities that previously have not been tapped, a child may step from relative obscurity into a prominent position. An example of this is offered in McKinnon's study³¹ in which children were observed over a period of years from the pre-school into the elementary school grades. One girl who had little influence in the nursery school and kindergarten rose to prominence in the elementary grades, and in the third grade she was elected as the class representative in the school at large. This girl was not much interested in the games played by her associates at the preschool level (she would, for example, point out inconsistencies in the make-believe games of her playmates). Later, however, the organized lessons in the elementary grades were much to her liking; they served as a basis for more satisfying social contacts as she joined with others in the work of the class.

Similar changes of role can be seen at all age levels, although oftentimes the persistence of early habits of nonassertiveness, or of a reputation acquired at an earlier time, may prevent an individual from showing his abilities when new occasions arise. An individual who moves to another locality sometimes rises to leadership in a manner that would not be possible in his old group by reason of the fact that his former associates had come to regard him as a minor figure or had held prejudice against him. Such shifts in role sometimes occur when children transfer from an elementary school in the heart

of a small community to a large high school, or from high school to college, or from college to occupations in the world at large. Frequently the folks in the old home town are surprised when a child who occupied a humble role makes a splash in the larger world. Conversely, through shifting circumstances, persons who have cut a figure in a limited setting may find that their reputations do not work in a new setting, and find it difficult to adjust gracefully to their lowered status.

Educational Implications. The fact that shifts such as these sometimes occur has a practical implication. The school should offer, as far as possible, a variety of opportunities for leadership.³² An educational policy which keeps the same pupils together from year to year under the same teacher and in much the same educational program may provide a semblance of continuity and security. But such continuity may prevent many individual children from benefiting from varied contacts in new class groupings under teachers who differ both in personality and in educational practice. Needless to say, it is not possible to arrange matters so that every child is a leader. Many children and adults do not seem particularly to desire to assume direction of others as long as they can be left to their own interests. Apart from desire, there are differences in ability to assume leadership. However, even though an individual may not aspire to leadership, he still likes to be noticed once in a while. One mark of an able teacher and of anyone who deals competently with other human beings is the ability to draw out and to give recognition to the good qualities of persons with whom they deal.³³

THE EFFECT OF

VARIOUS EDUCATIONAL PROVISIONS ON SOCIAL BEHAVIOR

In the foregoing, numerous references have been made to the manner in which environmental conditions may affect the character of a child's social behavior. A full treatment of this topic would go beyond the scope of this book, but some additional matters may be mentioned.

Nursery School and Camp Experience. In studies of the effects of nursery school attendance, it has been found that the opportunities there afforded are likely to promote a child's ability to enter into social contacts with others, and at the same time to promote his ability to assert his independence.³⁴ The effects of such opportunities will vary with different children. Moreover, as noted in a study cited at an earlier point, a child whose entry is delayed but who has had some opportunity to play with others outside of school may within a relatively short time become as active in his social relations as are children of the same age who have attended for a longer period of time. However, if a child's opportunities to associate with other children are delayed, he will eventually be at a loss, especially if, in the meantime, he is not acquiring the skills and play techniques that are used by the group that he ultimately has to join.

Camp experience or other opportunities for acquiring independence away from home likewise have been found to be of value to individual children, especially if they are overprotected at home and can be helped during the transitional period or if, in their regular environment, they labor under handicaps that prevent them from developing their social potentialities. An illustration of this is provided in one study (by Lowenstein and Svendsen)³⁵ in which a number of shy children from different localities were brought to a camp on a farm and were left free to follow their own devices. As time passed, the children showed notable changes in behavior: at first, they held themselves aloof, then they made contacts with other individuals, and then, as time passed, they entered into larger group activities; as their social activities expanded they also showed more of a tendency to be self-assertive. Many of the improvements in their behavior persisted after they had left the camp.

Influence of Skills. Opportunities to learn and to exercise the many techniques that are involved in social intercourse are an aid to good social adjustment, just as opportunities for practice are necessary for learning to ride a bicycle. Moreover,

deficiency in specific skills, as was pointed out in an earlier chapter, may hinder a child's social development and block an adult's social activities, just as the acquisition of special skills frequently will have a constructive effect. In one study (by Jack)³⁶ children who were notably nonascendant in their dealings with others received practice in certain skills (such as piecing together a puzzle), following which they were observed when matched with other children. It was found that in dealing with the situation in which they had acquired competence the children now expressed themselves more freely, were more self-assertive, less submissive, than before. In another study (by Updgraff and Keister)³⁷ a decline was found in "immaturity responses" (such as crying, showing a temper, asking for help) after children had received instruction that helped them to learn how to help themselves. Needless to say, the acquisition of skill alone cannot relieve deep-seated emotional difficulties that interfere with social adjustment. But in dealing with deficiencies in social behavior, measures are likely to be most effective if they involve the learning of practical techniques.

Influence of Methods of Direction and Control. Most adults realize that a courteous approach usually works better in dealings with other adults than do abrupt demands and dictator techniques. The same holds true in dealings with children. Requests that have a pleasant tone are likely to be more effective than scolding. Positive prohibitions are more effective than threats. Unhurried directions give better results than hurried directions.³⁸

In a study mentioned earlier (by Lippitt)³⁹ it was found that children of elementary school age responded more cooperatively to "democratic" than to "autocratic" techniques. When the former were used, the children were given a voice in the selection and planning of their activities, and the adult tried to treat them in a man-to-man fashion. When the "autocratic" techniques were used, the adult director made all decisions, gave very specific instructions, proceeded from one phase of the work to the next without informing the children of the plan as a whole, and made personal remarks instead of being objective in

his praise. In the "autocratic" situations, the children showed more aggressiveness toward each other, more apathy toward their work, and made less constructive use of the product of their work when it was finished than in the "democratic" situation.

In classes where "newer" educational practices have been in effect (permitting the children a greater amount of self-direction and opportunity for expressing their individual interests) it likewise has been observed that children are better able to assume responsibility for their own conduct, at least as far as keeping order in the classroom is concerned, than has been assumed by rigid disciplinarians.⁴⁰ Moreover, in this series of studies it was found that children who thus had more opportunity to assume responsibility for their classroom conduct were, if anything, superior to pupils from more rigidly controlled classes in self-discipline and socially acceptable conduct in certain out-of-school situations, such as on class visits to museums and other places of interest.⁴¹ To deal with children democratically is, generally speaking, not only a more comfortable but also a more efficient way.

The Need for Prudence in Applying Democratic Procedures. Although, as indicated above, comradely and "man-to-man" procedures in an adult's dealings with children are likely to work better than rigid and autocratic techniques, the fact remains that damage can be done if "democratic" policies are used indiscriminately. Democratic procedures like other procedures, should be scaled to size. There are many decisions relating to safety and present and future welfare that we cannot properly ask a young child to make for himself. Moreover, it is important not to put a heavier burden of responsibility upon children than they can bear. In applying democratic policies, an adult needs, if anything, to be more shrewd and sagacious than in applying authoritarian procedures.

Nor does it follow that children in a setting that is democratic as far as adult direction is concerned will proceed at once to work out democratic relations with one another. This lack has been noted in classroom situations in which the teachers

thought and action and, on the other hand, varying degrees of self-assertiveness and individualism, are normal and complementary features of the child's social development.

There is an advance with age from the infancy to the adolescent level, when children acquire a capacity for group behavior and for identifying themselves with group interests. According to available findings, however, it is not until the child has reached the intermediate elementary grades that he is capable of teamwork on a complex scale. In the early elementary grades the child does not seem to be able to encompass intellectually, or to identify himself in a practical manner with, the interests of a community as large as the enrollment of an average class, unless under direct adult supervision. As will be noted in more detail in a later chapter, children's contributions during class discussion at about the second-grade level deal preponderantly with their own private experiences and concerns, and there is relatively little continuity or meeting of minds in these contributions. At about the junior high school level, children's contributions in class discussion show decidedly more preoccupation with the larger affairs in the community or in the world at large, and there is also more continuity as children contribute jointly to the development of a topic or theme as distinguished from independent testimonials from individual members of the group.

Developmental trends can also be noted in other aspects of social behavior. Resistant or "negativistic" behavior is displayed by practically all children, beginning some time in the first year and reaching the peak by about the age of three and a half years, but prevailing thereafter in varying degrees in years to come. Resistant behavior is a normal feature of social behavior, but it can be aggravated by unnecessary interferences and thwartings. Children also show varying degrees of aggressive behavior, most overtly during the preschool years, and in more subdued ways during later years.

Aggressive behavior may serve varying functions in different children. In the case of a child who hitherto has been shy and withdrawing, a display of aggressiveness may be a tempo-

rary expedient and it may be a welcome and wholesome symptom of improving adjustment. Aggressiveness can be aggravated by techniques used by a child's elders and by restrictions that prevail in his general environment. There is evidence which indicates that rigid and autocratic practices in dealing with children are likely to arouse aggressiveness (or apathy) to a greater extent than do less rigid, more democratic, man-to-man procedures. In this connection it also is noteworthy that limited evidence from studies of children's responses to "newer" educational practices indicates that children are more capable of assuming responsibility for their own discipline and good conduct than has been assumed in the more traditional and rigid educational program.

Aggressive, resistant, and other forms of self-assertive behavior frequently receive more notice and seem to be more conspicuous than cooperative, sympathetic, and friendly forms of conduct. However, research findings indicate that in the behavior of normal children friendly responses quite outnumber unfriendly responses. Friendly, kindly, cooperative behavior is no less natural, no more a product of training, than is aggressive, unsympathetic, and competitive behavior.

Shyness or "withdrawing" behavior is shown by many children in varying ways at different age levels. Apart from attention to factors in a child's everyday life that would have the effect of subjecting him to continued failure or of lowering his confidence in himself, there is much that can be done in school and in other group situations to aid the child to find his way by degrees into group activities through helping him to use and to improve skills and interests that he already possesses or through helping him to acquire the skills that are useful in social intercourse but which he happens to lack.

By the time they reach school age most children understand the idea of competition. In many occupations, especially those in which an individual's performance is graded or marked in terms of comparison with others, the average child is likely to exert himself more when working for individual honors than when working for the group. However, the child is likely to

exert himself relatively more when working in behalf of a congenial group of his own choosing or on group projects that enlist his interest, than when working with an arbitrarily designated group or on group projects that have been arbitrarily assigned. Competitiveness is encouraged by the adult practice of comparing children with one another and by emphasizing the importance of being a winner as distinguished from playing the game. School marks, rating systems, the practice of giving extraneous prizes and rewards may also accentuate children's competitive activities. The competitive urge of parents and teachers are often deeply involved in the child's progress at school, especially in connection with the conventional school subjects. It may also be noted, however, that children's competition can give zest to many activities, that many situations involve both wholesome cooperation and competition, and that under the spur of competition an individual's habits and skills may improve in satisfying and wholesome ways.

In their own social groups children come to recognize, more or less clearly, that members of the group possess varying degrees of ability, popularity, and prestige. A child's position in the estimation of his fellows may, however, be out of keeping with his genuine worth. This situation arises if the group standards are influenced by prejudices that children borrow from their elders, or if the values by which the individuals are judged are limited in such a way as to give emphasis to qualities that a few children happen to possess and fail to emphasize other qualities which may be of equal or greater importance.

Children's social behavior is likely from an early age level to show the influence of the customs and standards of the social group to which their elders belong. Standards and customs vary more or less at different socioeconomic levels and in different ethnic groups within a single community. It is important for adults to remember this fact if they would understand a child's behavior.

Training for leadership is an important responsibility of education. Leaders among children usually are somewhat su-

perior in ability to the average of the group especially in the sphere in which they are recognized as leaders. However, ability is not alone the determining factor. To be a good leader a child should also be able to be a good follower in the sense that he should be responsive to the needs and wishes of his fellows and able to participate wholeheartedly in their interests and concerns. If children of superior intellectual ability are to capitalize fully upon their potentialities for leadership, it is important that they should have experiences that will help them to be socially acceptable to others.

Friendships or affinities between individuals are apparent from an early age in the social behavior of children. Friends tend, in general, to resemble each other more than they tend to differ from each other in their abilities and in their personality traits, although there are many exceptions to this. This factor of propinquity, or nearness in geographical space, is obviously important in determining the range of individuals from among whom the children's friends will be chosen.

All children, in one way or another, desire some degree of recognition, acceptance, and prestige in their dealings with others. Frequently behavior that seems aimed to arouse hostility and to cause an individual to be rejected springs indirectly from difficulties that he encounters in his efforts to receive attention and approval. Even a bad child wishes to be liked, and sometimes the punishment inflicted upon such a youngster merely widens the social distance between him and his fellows and intensifies his unacceptable forms of behavior.

QUESTIONS AND EXERCISES

1. What features of child behavior illustrate the principle that "socialized" behavior and "individualistic" behavior are not antithetical but represent complementary features in the development of personality?
2. Compare the account of changes with age in group behavior as set forth in this chapter with the account of the contents of children's contributions in free discussions as described in

Table VII, Ch. VI. What parallels do you see? What are the implications of these developmental characteristics from the point of view of children's "readiness" for various topics that fall under the general heading of the social studies?

3. In the light of the discussion of boy-girl relationships at various age levels, what are the advantages and what are the disadvantages of coeducational classes or coeducational camps at the intermediate elementary school level, the junior high school level, and the high school level?
4. Give illustrations of ways in which forms of social behavior that we come to take for granted and to regard as "natural" actually reflect the culture and customs that have surrounded the child since his birth.
5. Make a list of what you regard as differences in child-rearing practices or in standards or customs that are brought to bear upon children in different socio-economic or cultural groups with which you happen to be acquainted.
6. In the foregoing chapter, reference has been made to resistant, aggressive, and competitive behavior displayed at various age levels. To what extent, in your opinion, would these forms of behavior be much the same, and in what ways might they be quite different, if children were brought up in a society that had a political and economic system differing from our own? Consider this question from the point of view of the behavior shown at about the age of three years, eight years, fifteen years, and at maturity.
7. Under what circumstances would you regard a display of aggressiveness as a wholesome and encouraging symptom?
8. Make a list of enterprises that involve both competition and cooperation. Can you think of any activity or enterprise that represents "pure" competition (with no elements of actual or potential cooperation)? Can you name any enterprise that represents "pure" cooperation (with no discernible element of self-seeking or self-interest)?
9. List what you consider to be the values or benefits accruing from competitive behavior. List disadvantages or harmful effects.
10. What are some of the factors in a classroom situation that make it difficult to establish conditions that make for "free" competition?

11. What are some of the factors that aggravate competition and intensify the harmful effects that competitive behavior may entail?
12. List what you regard as important considerations in training children and young people to assume leadership. What are some conditions that block the development or emergence of potential leaders?
13. Describe ways in which, in your opinion, training and encouragement of everyday skills might help individuals to overcome handicaps in their social behavior.
14. The findings in several recent studies have been relatively favorable to "democratic" as compared to "autocratic" techniques in the management of pupils. What, in your judgment, are the limitations of these findings and what, in your judgment, are the practical implications of these findings for the teacher and the educational program?
15. In one study it has been noted that under some circumstances the more the class is relieved of autocratic direction by the teacher the more a few pupils tend to "take over," so that there may be even less equality of opportunity for the individual pupils than was the case when the adult was in charge. Is this result inevitable? What steps may a teacher and the pupils of a class cooperatively undertake to prevent this state of affairs?

CHAPTER VI



MENTAL DEVELOPMENT

This chapter will deal with various aspects of the growth of understanding, imagination, and reasoning. A later chapter will deal more specifically with the topic of intelligence and its measurement.

SOME GENERAL CHARACTERISTICS OF MENTAL DEVELOPMENT

Widened Intellectual Horizons. In earliest infancy, the world of the child seems to consist largely of stimuli that arise within or impinge directly upon his own body. Happenings that occur in connection with hunger and feeding, and the contacts involved in his physical care occupy a large proportion of his time while he is awake. The world of sights and sounds does not have the prominence it will assume in time. It is not until some time after birth that the child consistently is able to fixate or follow a moving object with his eyes. With the passage of time, however, vision and hearing, which bring the child into contact with the more distant environment, come increasingly into play. Eventually vision plays so prominent a role that we use visual terms to denote meanings that are not primarily visual in nature, such as "I see" when we mean "I know" or "I understand."

Widened Temporal Dimensions. Another aspect of the enlargement of the child's mental world consists in the development of ability to respond in terms of events that are remote in time as well as removed in space. The younger the child, the more his responses, his interests, and his preoccupations turn upon events that are in process of occurring. With advancing age, he is increasingly able to react in terms of recollections from the past and anticipation of the future.

Increase in Ability to Employ Symbols. The ability to encompass what is remote both in time and space is associated with an increasing ability to respond in terms of symbols, or to a part as representative of a whole. Thus, as noted in an earlier example, the hungry child who ceased his crying only when he actually was fed may later stop crying (for a while at least) at the sight of the bottle. After a toddler has had the experience of being dressed for the outdoors and then going for a ride, the mere sight of his mother approaching with his coat in her hand may move him to smile happily, to head for the door, and say "Car" in expectation of a ride. This capacity to respond to symbols or reduced cues that originally were parts of a larger context and now function for the larger context appears in connection with all mental operations.

Other Changes. Along with this ability to utilize past experiences, there are many related phenomena. With the passage of time, the child becomes increasingly able to make plans that do not demand immediate realization, to work for deferred goals.

He becomes increasingly able not only to respond to symbols or reduced cues, as noted above, but even to manipulate such symbols himself, to deal with *abstractions* as distinguished from the concrete. We see this, for example, when he is able to plan the itinerary of a day's hike by way of a map or by "working it out in his head." Such head work substitutes to a large degree for actual leg work of an earlier day.

Associated with an increase in ability to formulate plans and to envision goals that extend beyond the reach of his present experience, the child also becomes able to concentrate upon a project for a longer period of time. There is an increase in what has been called the "attention span" especially in connection with projects he himself has chosen.

Although changes in the directions described above are associated with increasing mental maturity, they do not occur in an all-or-none fashion. At a given age, for example, a child may show "thought before action" in his use of a hiker's map but not in the construction of a wooden box; he may persevere

over a long time to procure a desired stamp for his collection but abandon another project by reason of an incidental distraction.

Continuity in Mental Growth. Although changes such as those mentioned above are associated with increasing maturity, there are no distinct stages in mental development in the sense, say, that a child passes from a clearly demarcated stage of preoccupation with the immediate and concrete to a stage of preoccupation with the remote or the abstract. Throughout life a person is likely to be quite uneven in the extent to which he shows "mature" ways of thinking. He may operate on a very abstract level in his use of words and yet show little capacity for abstractions in his drawings. He may be capable of sustained, logical thinking in one area but not in others, and so forth.

Changing Preoccupations. While mental development cannot be described in terms of distinct stages, it remains true, of course, that certain features of behavior and certain developmental trends are more conspicuous at one mental age level than another. Thus, the first months of life represent a period when there is especially rapid development of sensory functions and their effective use. During the first year or two, likewise, the child does a great deal of exploring by way of his senses. He mouths objects, tastes them, lifts them and examines their texture. Sensory explorations of this sort continue to be prominent for some time after the first year as does attention to the shape and size of objects.

Similarly, beginning during the first year and becoming especially prominent during the second, there is a period of preoccupation with the use of language, appearing first in the vocal grunts, babblings, and use of varying sounds and inflections, reaching a milestone (as far as the adult observer is concerned) in the child's "first word," and continuing long thereafter.

Other landmarks may be noted, such as the beginnings of make-believe, coinciding roughly with the development of spoken language (although sometimes appearing in pantomime before the child is able to talk) and flourishing especially in

connection with his play activities for several ensuing years; and the beginning of the "questioning age," at about the age of three, when the child plies his elders with whos, whats and whys that spring from a lively curiosity, not unmixed with a desire for attention.

During the late preschool years, and throughout the years that follow, other features may be noted. Varying in time and intensity, there may, for example, be out-croppings of self-consciousness that seem to betoken that the child is more aware of himself as a person. Certain intellectual interests are prominent at certain age ranges, such as the almost universal interest shown by children in our culture in vicarious and rather melodramatic adventure in the age range from about five to twelve, and the appearance at the time of puberty of interest in romantic themes that were not very popular (with boys) at an earlier time.

The sections immediately following will deal in more detail with various manifestations of mental development.

MEMORY

As pointed out in earlier sections, evidence of the influence of past impressions can be noticed almost from the time of birth. As time passes, there is increasing evidence that the child himself is aware of details of past experience and is able to formulate such details and to act upon them in concrete ways.

Early Memories. The amount that an individual learns and remembers in the course of intellectual development is staggering to contemplate, but quite as impressive are the experiences that hold his attention for a time and then are forgotten. In Chapter II we noted briefly the fact that a huge proportion of childhood experiences during the first years of life, including many that seemed to be important at the time, are lost in oblivion. When older children and adults are asked to report their early memories, a majority will not recollect anything that happened until the age of three or later. Such recollections are likely to concern a few striking episodes and to reflect only to a slight degree the happenings and experiences that molded the

child's habits and attitudes from day to day, and that may influence his present behavior in ways that he is now unable to understand.¹

This phenomenon of forgetting continues, of course, throughout life (rather fortunately, as a matter of fact), but the forgetting of past experience does not occur on as wholesale a scale after about the third or fourth year as before that time. Many factors contribute to this, such as changes associated with the maturation of the nervous system, and the development of increased ability to formulate past experiences in terms of language. At any period of development, the experiences that are most likely to be remembered are, of course, those that either made a striking impression at the time or are closely associated with important goals. Thus, a boy who has raised a pig for the market may remember for a long time the market quotations published on the day he sold the pig; even at the age of eighty he may still remember this detail.

Memory of Pleasant and Unpleasant Events. Reports by adolescents or adults of their "earliest memories" usually show a large proportion of unpleasant events that were especially striking or unusual at the time. In the everyday process of forgetting, however, it has been found in studies of both children and adults that unpleasant happenings are less likely to be recalled than are pleasant happenings. For example, if a number of persons list the pleasant and unpleasant events that befell them during the preceding two weeks and then, two or three weeks later, are asked to write a similar list for the period in question, it is likely that the second report would include a larger percentage of the items on the original list of pleasant events than of the items on the list of unpleasant events.²

Dislocations in the Process of Remembering and Forgetting. This phenomenon of greater recall for the pleasant has variously been described as indicating a tendency toward the "obliviscence of the disagreeable" or "the optimism of memory." The tendency to recollect the pleasant more than the unpleasant no doubt helps to make life more agreeable, but

there are times when it would be very useful for a person to have a clearer recollection of unpleasant events of his past. A child's failure to remember events that are important in shaping his attitudes may be due, in part, to the fact that he was not clearly aware of what was happening. It may be due also to many other factors. Whatever the cause, the result may be that a youngster, as he moves into adult years, may not only be ignorant concerning the origin and meaning of some of his tendencies but may even have false notions concerning them.

LANGUAGE DEVELOPMENT

As already suggested, much of what we know concerning a child's intellectual development is revealed through the medium of language. A consideration of certain aspects of language development serves as a convenient means of discussing many features of mental growth.

Early Language Responses. The child's first vocalizations include a large repertory of sounds. Much of his vocalizing is in the form of cries that occur in connection with general bodily activity when he is hungry or uncomfortable, but even during the first days of life children use many sounds other than those involved in crying.³

A child uses sounds as a means of communicating with others long before he is able to articulate words. Inflections and intonations resembling those of adult language, and expressive of delight, anger, disgust, appeals for attention, scolding, and warning, have been noted several months before the appearance of the first word. The child likewise responds to the language of others long before he can use words himself. In such early responses, the tone and inflection of what is said to him have more meaning than the precise words that are spoken.

The Beginnings of Spoken Language. There is wide variation among children in the first use of words. Generally speaking, bright children tend to be more precocious than dull or average children in the beginning of speech, but even among children of similar intellectual promise there may be a difference of many months. It is difficult to state an exact time when

the "average" child begins to talk, not only because of such individual differences, but also because of difficulties in detecting and interpreting the "first word."

After they have spoken their first word or two, children do not always proceed to make tremendous strides in the acquisition of new words, but as time passes, the gains are, of course, enormous. At all ages, the number of words that a person can understand when he hears or reads them surpasses the active vocabulary that he has at his own command. After a child has learned to talk, the increase in his loquacity tends to be higher than the increase in his vocabulary.

Use of Phrases and Sentences. The average length of a child's remarks increases steadily throughout the preschool years and beyond. By the time a child reaches school age, simple sentences predominate, but as he advances toward high school he approximates more and more the professorial custom of using many complex and compound sentences. An indication of changes with age in the length of sentences is shown in Table VI.

TABLE VI

AVERAGE NUMBER OF WORDS PER REMARK AT DIFFERENT AGE LEVELS*

<i>Age in Years</i>	<i>Average Number of Words</i>	<i>Age in Years</i>	<i>Average Number of Words</i>
1½	1.2	4	4.4
2	1.8	4½	4.6
2½	3.1	5½	4.6
3	3.4	6½	5.3
3½	4.3	9½	6.5

* Adapted from D. McCarthy, *The Language Development of the Preschool Child*, and E. A. Davis, *The Development of Linguistic Skills in Twins, Singletons with Siblings and Only Children from Age Five to Ten Years* ⁴

Gains in Knowledge of Word Meanings. An important feature of language development is the gain in precision in using words, the ability to select terms and phrases to denote different shades of meaning and to recognize the varied denotations and connotations of words. This process of using terms

with increased discrimination and of learning the numerous different meanings of various words is never completed. It continues as long as the individual continues to live and learn.

The fact that a person uses a word in his spoken vocabulary is no guarantee at all that he understands the word in all its varied meanings, or even that he understands the meaning that is intended in a given context. This fact complicates the teaching of concepts at all age levels. It often happens that an instructor mistakenly infers from a pupil's use of a term that the pupil actually knows what it means. A teacher also often falls into the error of assuming that terms he uses will have the same meanings for his pupils as they have for him. In a history class, for example, a teacher may speak of Benjamin Franklin's work as a *minister* to France, and in response to questioning, pupils may correctly respond that Franklin was a minister to France when actually several of them are thinking of a minister as a clergyman.⁵ Again, a child may be slow in learning to differentiate the multiple meanings associated with a given word. Thus, a fifth-grader stated that a relief map brings relief.

Needless to say, there is no simple way in which the full meaning of terms used in school subjects can be learned once and for all, for it is only through meeting a term in various contexts that a person can learn its various meanings. However, there are practical measures that a teacher can take. He can be on guard against taking too much for granted. In numerous studies it has been found that pupils are quite hazy about terms that they are frequently exposed to and which they presumably should know. Moreover, the fact that a child can define such terms according to the book or by means of a teacher's words or examples gives no accurate indication that the meanings are clear. One procedure that serves both to reveal the child's degree of understanding and to overcome lack of understanding is to ask him to use or define words in terms of concrete situations with which he is familiar.

Influence of Environmental Factors on Language Development. It is only by having an opportunity to hear and to use the words of a given language that the child can learn the lan-

guage, but his ability to profit from such opportunities to learn will vary with his degree of maturity. The fact that a child's response to language stimulation is relative to his level of maturity is shown in a study (by Strayer)⁶ cited in an earlier chapter, in which early training was given to one twin for a period of six weeks, beginning at the age of eighty-four weeks, while the other twin was kept in a nonverbal environment. At the end of the period of six weeks, the child whose training had been deferred made comparatively rapid gains, and within a short time the two children showed little difference in the size of their vocabularies.

Although special stimulation and training do not transcend the limits set by the child's own growth, it also is true, of course, that language is decidedly influenced by environmental factors. A child who has a good deal of opportunity to associate with older children, and especially with educated adults, is likely to have an advantage over a child who is limited to associates of his own age or younger. Thus twins who spend a good deal of time with each other may be somewhat backward in their language development as compared with "singletons" who fraternize more with adults or older children. Children who live in homes of low socioeconomic and educational status, or in a notably unstimulating orphanage situation, may fail to realize their potentialities as compared with children living in more favorable situations.⁷

The child's environment likewise will have a notable effect upon his learning of correct pronunciation, good usage, and correct grammar. The youngster who is exposed to good language usage in his everyday life learns a great many of the countless details of such usage effortlessly and as a matter of course, while the child whose daily associates are illiterate must expend special effort to displace his customary speech habits with the forms required at school.

The necessity of adjusting to two different languages in a bilingual environment may also retard a child's progress in either of the two languages for a time. In the long run, however, exposure to two languages is not likely to handicap a

child's language development and intellectual progress to any material degree unless other disturbing factors enter in. In individual cases, the command that is gained of two languages may be quite advantageous.⁸ Apart from any language handicap that may prevail, unfavorable effects may, of course, occur if the child who is called upon to adjust to two languages is regarded as an alien by his associates or teachers and is ridiculed or ostracized.

Relation to Social and Emotional Maladjustment. A child's emotional maladjustments may also have a bearing on his language development. Refusal to talk is sometimes found as a feature of negativism and resistance, or of extreme shyness, in a child's relations with others. Frequently, however, a child who thus keeps his mouth shut still keeps his ears open and shows that he has a good vocabulary when he does feel like talking.

DEVELOPMENT OF CONCEPTS AND REASONING

The reasoning processes of children and adults are essentially similar, but there are, of course, many differences in the problems that concern an individual at different periods of his growth and the resources he has for solving them. As mentioned earlier, the younger the child, the more preoccupied he is with his own immediate concerns. The younger child also lacks the language for phrasing his thoughts and conclusions in adult terms, and he inevitably lacks the store of relevant information and experience that an older person has. He also has less capacity for long periods of concentration and for the marshaling of evidence in dealing with a complex problem. In matters that do not directly concern him, he is likely to be less responsive than is an older person to social demands for self-consistency, and in dealing with new problems he is more likely than an older person to resort to trial and error.

The child's reasoning often appears to be naïve and inconsistent; his answers sometimes betray what appears to be a lack of ability to reason from given premises to comprehension of cause and effect, and to weigh and criticize his own conclusions. It has been proposed by some writers (notably Piaget)¹⁰ that

there are basic differences between the reasoning processes of young children and older persons: that before the age of about seven or eight years a child is unable to think from the standpoint of a general proposition or another's point of view, is incapable of carrying on a genuine argument with others or examining the validity of his own conclusions. Actually, however, numerous investigators have failed to find distinct stages in the development of children's thinking or a fundamental difference between the thought processes of children and adults.* A child is likely to be naive and inconsistent, to be sure, but when adults are confronted with unfamiliar problems they make much the same kind of mistakes as does a child.¹² Give him a problem that ties in with his own information and experience, and the child will use good logic within the limits of his understanding and patience.

Concepts of Cause and Effect. One approach to the study of children's thinking has been to present a variety of problems to children at various age levels and then to note the kinds of answers they offer. The children are shown, for example, a lighted candle which goes out when a jar is placed over it, or a beaker of water into which a pebble is dropped, causing the level of the water to rise, and are asked to explain what happened. Likewise, they may be asked questions as to what causes the clouds to move or trees to grow. In studies of this sort it has been found that a variety of types of answers are given by children at all age levels.¹³ In studies of English-speaking children, most of the youngsters at all ages from kindergarten to maturity answer in terms of physical or mechanical causes, rather than in terms of magic, animism, or other mysterious forces. As children grow older, there is an increase in the number of problems for which they have adequate answers, but answers that are logical and scientifically plausible appear at all age levels in response to problems that lie within the child's grasp. It has also been noted in studies such as these, as well as in

* From one study (Dennis)¹¹ it appears that the kind of thinking Piaget describes may take place at a very early age, earlier than the age of the children who took part in most of the studies that have not confirmed Piaget.

others, that a child may offer a logical and correct answer to some questions and then answer quite illogically to other questions on which he is not so well informed or which he is not concerned about.

Capacity for Inductive and Deductive Reasoning. It has also been found that children of beginning school age are able to detect certain logical fallacies and to arrive at a generalization from given particulars, or to select from a number of alternative solutions the one that is compatible with all the given facts.¹⁴ A child is likely to solve some problems of this sort and to fail on others.

Changes with Age in Social Orientation and in Understanding of Abstract Concepts in the Social Studies. As already noted above, the younger the child, the more preoccupied he is with his direct, personal concerns as distinguished from large social problems or long-term issues of cause and effect. The findings set forth in Table VII illustrate this. We have also previously noted that during the early grades, the child's social orientation in his friendships, his loyalties, his role as a leader or follower, is restricted to smaller groupings within the class. Even in this limited sphere the team spirit is not likely to be strong.

A child whose comprehension is thus limited within his own everyday social sphere has a very limited background for grasping the larger and more remote social issues involved in units on history, community organization, conservation, and other topics that frequently are stressed in the social studies in the early grades. It has been found that children show a good deal of haziness and many misconceptions concerning ideas that are freely used in the social studies. Table VIII, which is based upon studies by Pressey and Pressey, shows the percentage of children at various grade levels who answered correctly when tests were made of their ability to recognize the meanings of terms that are used in the study of American history. [Sample item: "What name was given to large areas before they became states? (a) Cities (b) Factories, (c) Territories, (d) Jungles.] It should be noted that the form of the test item will influence

TABLE VII

CHILDREN'S CONTRIBUTIONS DURING "FREE DISCUSSION"
PERIODS IN THE CLASSROOM

Each group of entries shows the percentage of contributions at Grades II, IV, and VI that fell into various categories when analyzed from different points of view.*

Grade	II	IV	VI
Number of pupils	62	54	45
Relation of pupils' contributions to remarks made in the preceding discussion:			
"New topic," no logical continuation of what has gone before	87	33	23
"New topic," not directly related to previous material but apparently suggested by previous contributions	8	24	33
Continuation of a previously introduced topic or theme, further discussion of topic already introduced	4	43	44
Subject matter of contributions:			
Personal activities, experiences	61	41	18
Animals	10	7	8
References to books, radio programs, movies (other than content of current news)	7	13	6
Current happenings, events, activities of people other than contributor (world and domestic news)	18	29	60
Miscellaneous	4	10	9
Locale or place referred to in matter discussed:			
Immediate physical environment	84	55	27
Remote locality (<i>e.g.</i> , submarine sunk at sea)	15	41	71
No definite or implied reference to place or location . .	1	4	2
Medium, agency, or channel through which contributor acquired the material or information contained in his contribution:			
Personal presence, direct contact with event described . .	83	52	25
"Reflection," process of mental association (as in expressions of opinion, questions, elaboration of another's remarks, etc.)	1	15	18
Other media, persons, or agencies (conversation, reading, radio, etc.)	16	31	56
Undetermined	0	2	1

* Adapted, in abridged form, from Harold V. Baker, *Children's Contributions in Elementary School General Discussion*.⁹

the correctness of a child's response: he may give the correct answer to an item such as the foregoing by rejecting alternatives that he knows are wrong even though he might not be able to give a definition of his own or use the term in question in an appropriate sentence when requested to do so.

TABLE VIII
PERCENTAGE OF CHILDREN IN EACH GRADE
WHO CORRECTLY RECOGNIZED
THE MEANING OF VARIOUS TERMS*

<i>Term</i>	<i>Grade</i>				
	<i>4</i>	<i>6</i>	<i>8</i>	<i>10</i>	<i>12</i>
Official	28	59	78	91	94
Representative	26	53	62	76	82
Secretary	4	21	23	30	59
Democracy	28	50	80	84	95
Government	10	25	44	51	51
Self-government	37	42	76	76	85
Territory	37	88	96	97	98
Charter	21	58	60	65	77
Petition	21	33	55	74	89
Tariff	27	33	78	82	86
Democrat	33	51	87	91	92
Progressive	15	23	16	23	41
Socialist	11	25	42	50	75
Republican	33	51	87	91	92
Radical	9	20	31	52	78
Conservative	9	20	31	52	78
Public utilities	18	34	45	62	73
Liberty	84	89	99	99	99

* From L. C. Pressey, "A Study in the Learning of the Fundamental Special Vocabulary of History from the Fourth through the Twelfth Grades."¹⁵

Practical Suggestions for the Teaching of Social Studies. The difficulties involved in the teaching of concepts associated with the social studies are emphasized not only by evidence obtained from studies of elementary school pupils but also by the limitations of knowledge possessed by high school pupils as well as by presumably well educated adults. What seems to happen, in both traditional and presumably progressive schools, is that children are exposed to a good deal of instruction in abstract terms which they do not understand.

The main practical suggestion that emerges from the study of the development of children's concepts, as far as social issues are concerned, is that such concepts should be presented as realistically as possible from the point of view of the homespun details of everyday life. The good or bad qualities denoted by

many abstract terms such as justice, tolerance, monopoly, fair trade, democracy, unrestricted competition, and equality of opportunity can be translated into terms of concrete happenings in the classroom and in the everyday social behavior of children. Many economic concepts can similarly be rendered in terms of children's everyday experiences.

Concepts of Time. According to available evidence, it is not until after the age of nine or ten years that the average child has much understanding of time in the historical sense.¹⁶ Knowledge of the sequence and duration of historical periods is likely to be quite spotty and limited, well into the high school grades. Units of instruction in the early grades that dwell upon the memorization of the dates of historical events, or upon geological eras, are likely to have little meaning. Similarly, in the early grades, units on the early American Indian or Ancient Egypt will have a once-upon-a-time storybook flavor for children and are not likely to convey the ideas concerning chronology and continuity in human affairs that a teacher may intend. As such, a unit of this kind may still have value, especially if it affords practice in concrete intellectual and manual skills and experience in cooperative effort.

An interesting indication of the manner in which a child's concepts of time and chronology seem to improve as a child's abilities mature and through the accumulation of everyday experiences associated with growing older (as distinct from special training during brief periods of instruction in the classroom) is offered in a study by Pistor,¹⁷ which was reviewed in Chapter II. Two equivalent groups of sixth-grade pupils were studied. Pistor points out that the evidence indicates that the factor of maturation and the educative influences to which a child is exposed in the course of his everyday experiences, appear to be more influential about the sixth- and seventh-grade levels than formal instruction concerning time or the use of time charts, time lines, and other devices.

General Information. The findings in studies dealing with children's information do not supply an inventory of standard items of knowledge which the average person at different age

levels is likely to possess and which the teacher can count upon in planning a lesson unit. To supply such an inventory would perhaps be impossible by reason of tremendous variations in the specific items of information possessed by children from varying backgrounds. Children in one community, for example, may be ignorant of bits of knowledge concerning biology, human institutions, everyday happenings, and topics of conversation that are regarded as commonplace by children in another locality. In one study it was found, for example, that only about a fifth of city children in the age range from eight to twelve years had any notion that animals other than cows and goats have milk for their young.¹⁸ Groups of children showed wide differences in their knowledge concerning commonplace objects and commodities (such as the animal from which we get beef and where leather comes from), concerning sizes and distances and space in relation to time (such as the approximate distance a soldier can march in a day, whether a ton of coal would completely or almost or not nearly fill the space available in a large classroom), concerning directions (such as whether the sun rises in the north, south, east, or west).

It has been noted also in studies of information, as in studies of their understanding of words, that children may be able to repeat general items of information involving a given concept and yet be quite ignorant concerning the application of the same concept in another setting. Thus, children may report about the northward and southward flight of birds, and about the North and South Poles, and yet be ignorant as to whether well-known points of local geography (such as the city hall or a nearby river) lie to the north or south of their homes. Some such gaps are, of course, inevitable; they are exhibited by adults as well as by children, and they may make little difference as far as the child's progress in his studies is concerned. On occasion, however, lack of a given item of information may have a crucial bearing upon what children learn from a project and the correctness of their conclusions.

In connection with a given course of study, it is possible to

devise comprehensive information tests that can reveal details that pupils know or do not know. In order to be most effective, such tests should be constructed in terms of the objectives and the specific content of a given unit of instruction. Such is the specificity of children's information on some topics, however, that even such a test may fail to reveal a pupil's difficulties, for he may be able to answer a given question in terms of what he has read or heard and yet a different phrasing of the question might reveal that he has not fully grasped the item of information that it involves. For this reason, the insights that an able teacher can obtain through a variety of informal, person-to-person contacts with individual pupils are likely to reveal more concerning their information, and the ways in which they best can be helped to learn, than will be revealed by the results of a formal test.

Emotional Factors in Thinking. In many areas, a distinction can be made between a person's knowledge about a matter and his attitude toward it. A person who knows little about a subject may express strong prejudices with respect to it, while another person who is better informed may be quite dispassionate. Likewise, two persons who have the same store of general information may differ in the stand they take by virtue of differences in their past emotional experiences. Indeed, as indicated in an earlier chapter, an individual's evaluation at any given time may be influenced by earlier experiences that he cannot recall. Many of the likes and dislikes, expressions of partisanship, prejudice, or enthusiasm that a person exhibits in everyday life trace to earlier direct experiences that had an emotional quality.

Moreover, attitudes frequently arise through secondary means, such as conversation, pictures, reading materials that have a favorable or unfavorable tone. The smaller the amount of information or understanding a person has with respect to a given issue, the more credulous he is likely to be and therefore the more susceptible to such influences.

Once a person has taken a stand he may persist in it quite tenaciously in spite of later contradictory evidence. This is

especially likely to be true if his own desires or self-interest are involved. In matters involving his own prestige he may not only reject information that is unfavorable but he may also seek information to confirm his bias. Similarly, he is more likely to learn and use information or viewpoints that he desires to be true than to make a disinterested search for the facts.

In studies of children it has been found that in connection with many topics there is little correlation between the intensity of partisanship and the amount of information possessed. In an investigation of children's information and attitudes concerning the wars that prevailed at a given time in 1940 (Japanese *vs.* Chinese; Russians *vs.* Finns; the Axis powers *vs.* the Allies) it was found, for example, that there was little change with age in expressions of attitudes toward the belligerents even though there was a substantial increase with age in the amount of knowledge the children had concerning the belligerents, personalities, implements, forms of strategy, geographical features, etc. There was a very low relationship (a correlation of .14) between quantitative scores in tests designed to measure firmness of opinion or degree of partisanship and tests of amount of information.¹⁹

This does not mean, of course, that attitudes invariably remain fixed. Numerous studies, mainly centering on high school and college students²⁰ indicate³ that shifts in attitude may be obtained by means of lectures, reading materials, etc., and that notable changes may occur over a longer period of time, such as the interval between the freshman and the senior year in college. However, changes can more readily be induced in attitudes relating to issues or policies that are academic or remote from an individual's day-to-day concerns than in attitudes that are deeply rooted in early childhood experiences or bear upon an individual's self-interest or desires in his everyday life.

The Difficulty of Setting Intelligence Free. The fact that children acquire favorable or unfavorable attitudes with respect to many issues while yet they have little information and little capacity to judge a matter pro and con, has many important ramifications. It makes it easier for adults to pass their own

beliefs and attitudes on to each new generation of children. It helps to account for much of the irrational behavior shown by adults. It helps to promote the large volume of indoctrination that goes on in school (even under the instruction of a teacher who tries to help children to arrive at their own conclusions). It also accounts, in part, for the lag between advances in science and knowledge and the application of knowledge to practical affairs.

This influence of feeling upon thinking should not, of course, be regarded as something that is always detrimental. Deeply felt convictions may be wise and true as well as false. However, the fact that this phenomenon occurs so universally constitutes one of the most difficult problems in education. As adult's ways of thinking tend to become so entrenched that there are strong barriers against new insights or a fresh way of looking at things. Moreover, adults pass along to others their ways of thinking, whether archaic or not.

High intelligence alone is no protection against this, for bright people may use their high intelligence to fool themselves as well as others. Moreover, as Murphy²¹ has pointed out, a person can possess a phenomenal capacity for original thinking in one area while his views in another area may be childish and naive.

Teachers share with other human beings this tendency to try to bolster rather than re-examine a position that once has been taken, and a tendency to let their conclusions be swayed by their desires and their fears. The more such a tendency prevails, the more the teacher is putting blinders on a pupil instead of sharpening his intellect. A great amount of indoctrination takes place under the guise of disinterested pedagogy at all educational levels. All of us in the teaching profession are a party to it. But it is easier to see how our teachers and professors indoctrinated us than to see how we, in turn, are indoctrinating others. Even close self-examination may fail to reveal the extent to which the ideas we emphasize and the ideas we ignore, what we accept on the basis of limited evidence, and what we reject on the same basis, may be determined by per-

sonal factors instead of disinterested scholarship. Even so, it is not likely that self-examination will do any harm.

Ideas that are so taken for granted that free inquiry is blocked often are ideas that many people have in common. There are many such ideas in education (as in all other walks of life). Most people take for granted, as something neither wise nor foolish, but as something that simply is in the nature of things, that schools should be laid out about as most schools are; that an elementary school teacher and twenty or thirty or forty children should be tied to a room most of the school day; that a bright child should fritter his time in the classroom as best he can instead of being free to ramble; that a dull child should likewise stick it out whether or not he is learning anything; that children should, on the average, reach a certain level of achievement in the subject matter skills at a certain age because their fathers and mothers and other children, tested in a large survey, reached that level; that instruction in arithmetic should be paid for by public funds but instruction in playing the piano or the piccolo should be paid for privately; that the cost, per child, of a whole year's schooling should be about what it costs a man to buy a fairly expensive suit of clothes; that college professors should be paid more than nursery school teachers; that there are certain things that are "fundamental" while other things are "fads and frills." The conventional position in each of these matters perhaps is the correct one. (As the saying goes, "Fifty million Frenchmen can't be wrong.") But unless, in our thoughts about education, we are able to entertain even mildly unconventional notions, it is likely that our thoughts, after strenuous cogitation, will simply lead us back to where we started.

DAYDREAMS AND DREAMS

Functions of Daydreams and Make-Believe. Children begin to dream and to engage in make-believe in infancy, and most persons continue these enterprises throughout life. Make-believe and daydreaming serve an important function in the child's development. Make-believe serves as a means of organiz-

ing much of the young child's activity. It provides a setting for the exercise of motor skills. It functions as a vehicle for social contacts and as a means of organizing group projects. Through it the child is able to transcend time and space and his limited powers and thus give play to ideas and activities that otherwise would be dormant. In time, make-believe may represent a retreat from reality, but in early childhood, and to a lesser extent in later years, it serves as a way-station to realistic dealings with life.

Content of Make-Believe. The imaginary activities of normal preschool children deal to a large extent with domestic themes or patterns of activity that they have experienced or observed in their everyday lives, such as housekeeping, preparing and eating foods, caring for animals, going on trips by automobile, train, or boat.²² In their make-believe children reflect many of their wishes. The child who actually is allowed less cake than he would like may provide an unlimited supply of make-believe cake. Children who are burdened with emotional problems will also occasionally reflect these in their make-believe play or spoken fantasies, as when a child who is jealous of a younger sibling devises a make-believe situation in which the little child is naughty and is punished, or is left alone at home when the rest of the family goes on a trip.

The fact that a child may unwittingly reveal his private thoughts and feelings in an imaginative setting has been utilized in the development of a variety of so-called projective techniques.²³ Make-believe themes continue in the play of children in the early elementary school years, but during the late preschool years and thereafter less and less of the child's imagining is revealed by his overt activity or his language. As the child's imagining becomes more private it also tends to deal less with everyday events and it includes more adventurous or dramatic themes in which the child plays a heroic role. Many of these vicarious experiences that a child undergoes are remote from everyday life as far as the actual happenings are concerned, but their emotional content is influenced by the child's everyday desires and frustrations.

Factors Causing a Diminution in Make-Believe in Later Years. Although daydreaming continues throughout life, a child is likely as he grows older to lose some of his ability to abandon himself in fantasy. With an increase in his abilities, there is less need for supplementing his powers by make-believe, and the enlarged range of his everyday activities encroaches upon the time available for daydreaming. As he gains in knowledge and experience, he also becomes more aware of inconsistencies and he finds it difficult to lose himself in impossible make believe situations. Sometimes an older child will bring his knowledge to bear in such a manner that a daydream becomes so arduous that it is abandoned, as when he starts blithely as a daring aviator and then becomes engrossed with the problem of making proper provision for landing fields, fuel, special equipment, and other spare parts. Older children vary, however, in their tendency to abandon themselves in fantasies, as do adults. For one individual, daydreaming may serve only as a momentary form of relaxation, while for others it may serve as a refuge, a substitute for action, a chronic form of giving play to resentments, gratifying wishes and ambitions, or devising excuses for failure actually to achieve. The daydreams of the same individuals at different times may range from a flow of imagery that approximates organized planning and thinking to snatches of unrealistic fantasy.

Ramifications of Children's Make-Believe. The capacity for make-believe has wide ramifications in the everyday interests and pursuits both of children and adults. When children, for example, read adventure stories, or give eager attention to radio serials and motion pictures, they are indulging in a form of make-believe. Frequently a child or adult who is quite realistic and businesslike in his everyday enterprises will be devoted to serials that involve impossible or absurd situations and spurious character portrayal, just as in his own daydreams he may venture into impossible situations and perform impossible feats.

Such tastes in drama and fiction by way of reading materials, radio programs, and the movies frequently are looked upon with intolerance and disdain by adults whose own make-

believe tastes are somewhat more sophisticated. Such differences in taste sometimes leads to friction between adults and between parents and their children. Much friction of this sort could be avoided if adults had more respect for characteristics that are a normal feature of the development of children, and more regard for individual differences among their fellows.

There are, of course, numerous other practical issues involved in the management of children's reading, radio, and movie interests. These include the matter of the amount of time that profitably may be spent on such pastimes, possible ill effects from emotionally exciting stories and dramatizations, interference with homework and other duties, and concern for the convenience and comfort of other members of the household. Moreover, it also may be noted that it is not necessary to resort to crude, melodramatic absurdities to satisfy a child's interest in vicarious experience.

Make-Believe and Realism in Children's Pastimes. As indicated above, children's reading, movie, and radio interests parallel their make-believe interests in many ways, but just as the child carries on many realistic * projects apart from his make-believe in his everyday life so he also seeks solid fare in his reading and, usually to a lesser extent, in connection with movies and radio programs. In his reading, for example, the child shows much interest in adventure, but in the intermediate elementary grades and beyond, many children dip extensively into factual and informative materials, such as writings on travel, nature lore, history, biography, and how to do and make things. Such interests may be permanent if associated with practical interests or hobbies, such as photography or mechanics. When reading materials thus tie in with a concrete, practical concern, a child will master rather difficult details concerning chemistry, electricity, nature study, and the like that would not appeal to him in the abstract.

Moreover, when children do seek information, as in volun-

* It may be pointed out that a factual account dealing with "real" events may be quite "unreal" from the child's point of view if it deals with matters that are remote from his own concerns and everyday knowledge.

tary readings in the field of science, most of them like to have it in interesting form, to be sure, but many of them also like to have it "straight," without needless embroideries (such as personification in the study of animals). This point is emphasized in a study of children's choices in science books, in which it also was found that children would select books over a wide range of "reading difficulty" in seeking information on a topic in which they were interested.²⁴

Children's Interests in Radio Programs. In their choices of radio programs children give a high vote to adventure serials, as indicated in Table IX. Large numbers also seek other types of offerings, however, such as concerts, news broadcasts, hobby and "quiz" programs, and dramatizations of historical events. Some of these types of programs gain in appeal as children pass from the upper elementary into the junior high school period. The extent of their appeal is not adequately shown in a summary such as that presented in Table IX, which lists only the twenty programs that had the highest rank in the study in question.

While some programs increase in popularity as children grow older, others show a decline. Programs based upon frankly make-believe themes (such as dramatizations of fairy tales) have more appeal in the age range from about six to eight years than thereafter. Programs of a "folksey" sort (reminding children of their birthdays, and including "chit-chat, story, and song" for young folk) likewise lose in favor in the age range from five to twelve. One such program, noted in Table IX, ranked fourth from the top in popularity at six to eight years, and fell to a rank of twenty-five from the top at ten to twelve years. Certain programs of a distinctly juvenile sort, involving melodramatic adventures revolving around juvenile characters, retain a high degree of popularity throughout the range from six to twelve years, but show a decline in popularity thereafter. It may be noted, in passing, that surveys of children's radio and movie interests show that the most popular productions are likely to include many that are primarily directed at adults, as distinguished from "juvenile" features.

The extent to which children are attracted to vicarious experiences by way of reading, radio programs, and motion pictures is indicated by the amount of time devoted to these pas-

TABLE IX

The twenty radio programs reported as "listened to" most frequently by children in the Metropolitan New York area in 1936 and 1937, including comparisons between boys and girls and between children aged 6-8 and 10-12 years. The values show the rank of each program in frequency of mention as compared with all other programs that were named. (A value of 1 means that the program ranked first or was mentioned more frequently than any other; a rank of $6\frac{1}{2}$ means that the program in question was tied for sixth place with another program.) Programs designed primarily for children (juvenile) and for adults are so labeled. Adapted from A. T. Jersild, *Children's Interests in Radio Programs*.²⁵

Program identification, Fall 1936	Number of Children			All Boys	All Girls
	6-14 yrs.	6-8 yrs.	10-12 yrs.		
	1344	355	649	726	618
Adventures of a boy and company, cowboy setting, but varied locale; considerable humor and horse-play (juvenile)	1	3	1	2	1
Interplanetary adventures in a future setting, rocket ships, etc. (juvenile)	2	2	2	1	3
Comic-strip detective hero (juvenile)	3	1	3	3	2
"Western" drama of an earlier generation (juvenile)	4	9	4	4	$6\frac{1}{2}$
Adult comedian; songs, jokes, variety (adult)	5	$7\frac{1}{2}$	5	$5\frac{1}{2}$	$4\frac{1}{2}$
Melodramatic adventures of a high school boy and company (juvenile)	6	$7\frac{1}{2}$	6	$5\frac{1}{2}$	$8\frac{1}{2}$
Adult comedian; relatively subtle humor; variety (adult)	7	16	10	7	$6\frac{1}{2}$
Melodramatic adventures of a girl and company (juvenile)	8	5	8	13	$4\frac{1}{2}$
Mystery and crime (adult)	9	14	7	10	$8\frac{1}{2}$
Comic-opera strong-man, with music, fantasy in contemporary setting (juvenile and adult)	10	6	11	10	11
Homely drama of two black-face characters (adult)	11	11	12	12	11

TABLE IX (Continued)

	<i>Number of Children</i>				
	<i>6-14 yrs.</i>	<i>6-8 yrs.</i>	<i>10-12 yrs.</i>	<i>All Boys</i>	<i>All Girls</i>
<i>Program identification, Fall 1936 (continued)</i>	<i>1344</i>	<i>355</i>	<i>649</i>	<i>726</i>	<i>618</i>
Melodramatic adventure and crook-thwarting by a juvenile character and company (juvenile)	12	18	9	10	15
Adult male and female comedy team (adult)	13	12	13	15	11
Adventures of a boy and com- pany in prehistoric times (juvenile)	14	17	14	8	28
Drama of two women characters and company (adult)	15	13	16	19	13
Amateur hour (adult)	16	23½	17	16	16
Crime and crime detection (adult)	17	32	15	14	21½
Chit-chat, story and song for young folk (juvenile)	18	4	25	17	17
Everyday and unusual adven- tures of two everyday children and company (juvenile)	19	19	18	19	18½
Amateur hour of juvenile per- formers (juvenile)	20	15	19	29	14
<i>Other programs among top 20, Spring 1936</i>					
Adventure involving mystery, magic, and villainy (juvenile).	6	—	—	6	6
Adventures of two boys and com- pany (juvenile)	7	—	—	8	9
Comedian and cast (adult)	11	—	—	9	12
Weekly dramatized stage or screen play (adult)	15	—	—	23	11
Canadian Mounted Police ad- ventures (juvenile)	18	—	—	10	29
Dramatizations (adult)	19	—	—	13	22
<i>Other programs among top 20, Fall 1937</i>					
Adult funny-man (juvenile and adult)	9	—	—	13	11
Cowboy and Western serial (juvenile)	13	—	—	8½	18½
Crime and detective (juvenile)	15	—	—	11	17
News dramatization (juvenile)	18	—	—	14	25½

times. The average child of elementary school age spends many hours every week at the radio (there is a marked reduction, usually, with the coming of spring and summer and longer hours of daylight for outdoor play). The amount of time varies with different children, and children frequently combine radio listening with another activity. A large percentage of urban children likewise go to the movies at least once a week. Additional time is spent in reading comic books and comic strips, but the exact amount of time thus consumed is rather difficult to estimate. Data are not available for providing an accurate measure of the total amount of time devoted to these three types of entertainment. However, in the case of city-dwelling children of middle or below-average socioeconomic status, it can roughly be estimated from the available information that the average child during the span of years from seven to fourteen devotes about the equivalent of one year of his waking hours to these pastimes. The fact that children spend so much time in these activities offers those who provide movies, radio programs, and comic strips a tremendous temptation to exploit children's lack of information, their susceptibility to fear, and their desire for excitement.

Dreams. The content of dreams includes material from experiences of the day, but the elements and the associated images often are drawn from such diverse contexts that it is difficult to recognize their origin. In the dream, to a greater extent than in the daydream, the happenings are vivid and seem real. They are likely to lack apparent consistency and to present impossible combinations of events. But although dreams may be bizarre and seem quite meaningless, they do not "just happen." Their contents have roots in everyday experiences, and their emotional tone is influenced by the joys and sorrows, the desires, feelings of hostility, hope, despair, and fear of waking life. A recurrent terror dream, for example, although it may occur in many forms and involve situations that present no direct menace during the day, bespeaks the presence of unresolved anxieties, just as pleasant dreams may bring gratification of

wishes that a person entertains more or less frankly during his waking hours.

In children as in adults dreams sometimes have an incidental disciplinary value and serve to strengthen resolutions of the day, as when a child who is chronically tardy dreams that it has become dark during his return from an errand, and that the door of the house is locked, or a professor dreams that he is late for class and all the students have gone.

Pleasant as well as unpleasant dreams are common in the lives of most children and adults. A large proportion of young children experience terror dreams on occasion, and frequently a child will pass through a period when such dreams frequently recur. As indicated by the findings in one study²⁶ there is a decline with age from the preschool period onward in the frequency of vivid terror dreams, but such dreams recur at any time of life.

Unpleasant dreams are likely to be more frequent during times of stress, and they may be precipitated by temporary disturbances such as illness, extreme fatigue, and unusual excitements that have occurred during the preceding day. The fears reflected in the dream are more likely to resemble irrational fears that are entertained during waking moments (such as fear of wild animals, falling from extreme heights, being attacked by bad people) than the dangers that actually threaten during the day. A notable exception to this occurs sometimes in the case of recurrent dreams following an actual harrowing experience, such as being involved in a traffic accident.

MORAL CONCEPTS

The child's first ideas of right and wrong are determined largely by the verdict of his parents concerning acts that are forbidden or permitted. Throughout life an individual's moral code continues to be determined to a large extent by rules in the form of conventional standards, and, directly or indirectly, the teachings of religion. The fact that there are ready-made conventions and moral demands does not necessarily mean that a person is being "done about," for there would be chaos if

each individual, in every act of his life, were to depend solely upon precepts that he has reasoned out for himself.

Even from a rather early age, however, the child is able to formulate some moral principles in terms of the reasons that lie behind them and to adopt them as his own rules rather than simply as edicts that have to be obeyed because others have so told him. This is illustrated by the findings in the study reported in Chapter V in which children were asked what they thought about cheating in their school work.²⁷ At still earlier levels children have many opportunities to learn the meaning of rules of conduct through the natural consequences of their acts, as when they learn to curb their impulse to hit another child or to snatch his possessions, in order to avoid retaliation or the discomfiture of seeing another cry.

In childhood as in later years, a person's ideas as to what constitutes proper conduct are likely to show many irregularities and inconsistencies. He may have rigid principles concerning the wrongfulness of cheating, stealing, and mayhem under some circumstances and yet condone such acts in other circumstances in which his principles should apply with equal force. The consistency with which he exercises his moral code will depend in part upon specific learning, in part upon the likelihood of direct retaliation, in part upon the remoteness of the issue from his own daily life, and, in large part, upon his desires and prejudices. Children learn at a relatively early age, through the example of their elders, to take many such inconsistencies and evidences of insincerity for granted, and to rationalize the inconsistencies in their own practices when they are called to account.

SUMMARY

In the foregoing we have noted many of the changes that take place in the intellectual life of the child as he develops from infancy to maturer years. At birth the child's higher brain centers are as yet not fully developed. He is responsive to some forms of sensory stimulation but he does not have the sensory acuity that he will acquire in time. His "mental world" at the

start seems to consist primarily of experiences arising through direct physical contacts with the environment and through the sensations that arise within his own body. With the passage of time impressions received through the "distance receptors"—the eyes and the ears—gain increasing prominence. Through the accumulation of experiences from day to day more and more events take on meaning. He becomes able to differentiate between phenomena that earlier were not distinguished from one another. There is an increase in his capacity to respond to symbols or "reduced cues."

Most of the experiences that befall the child during the early years of life while his mental capacities are rapidly developing are lost in oblivion. A majority of persons are unable to recall with any degree of accuracy events that befell them before the age of about three, and even then their recollections are scanty compared with the sum total of their experience.

In the process of growth the child's mental world expands in many dimensions. As he moves from the cradle to the larger world his mental horizons widen. At an early age, likewise, his experiences gain in depth, so to speak, as the present event is interpreted or reacted to in the light of past associations. With the development of the imaginative abilities and the ability to plan, the dimensions of the child's mental world are extended into anticipation of the future.

Beginning perhaps as early as the first year of life, children exhibit the ability to imagine and to engage in make-believe. Such make-believe activities, although they may eventually function as a form of escape and operate as symptoms of emotional maladjustment, serve as an instrumentality in the child's exploration of the world and in his efforts to organize his experiences and to solve his problems. Through the use of make-believe he is able to enter vicariously into a wider range of experience and to transcend, in part, his own limitations. Related to his own private daydreams is his interest in vicarious experiences that are provided for him by way of his reading, and by way of radio programs and motion pictures.

With advancing age there tends to be an increase in the

child's ability to concentrate over longer periods of time. The ability to give sustained attention varies with the nature of the task. The child's span of attention is likely to be longest in the case of activities that he himself has chosen or that are undertaken in connection with his own designs. In general, there is an increase with age in the child's ability to give sustained attention to an assigned task.

The development of children's ability to reason is gradual and continuous rather than characterized by distinct stages. However, there are changes with age in the range and complexity of problems which engage the attention of children and to which they will apply themselves. The younger the child, the more do his everyday thoughts tend to be concerned with events related to his own immediate experience and well-being; as he grows older, he becomes increasingly able to occupy himself with more remote issues and to deal with abstractions as distinguished from concrete experiences. Such changes can be noted in connection with the enlargement of the meanings associated with various terms in the language that he uses, in the interest and ability he eventually displays in dealing with social issues, and in his ability to take cognizance of events in the larger world in terms of both present happenings and the historical past.

In the development of information and concepts it is likely that a child's knowledge or grasp will vary considerably in the case of different topics or areas of experience. Depending upon his past opportunities for learning he may be well informed and be able to reason effectively in connection with one topic and not in connection with another. Accordingly, he may seem very naive and illogical in dealing with one problem and quite logical in dealing with another. It also is true that when adults face a problem that is new or quite unfamiliar they will make errors and give inconsistent or illogical answers similar to those that may be offered by a child. However, changes that normally come with added maturity cannot be brought about simply by giving the child concentrated experiences or special training over a short period of time. Many of the gains that are shown,

such as speed of perceptual response, the ability to grasp concepts relating to matters remote from the child's own immediate experience (like the concept of historical time), and the ability to learn and to master subject matter (such as long division in arithmetic) do not result from coaching alone. Concentrated periods of practice or instruction at a given stage of growth cannot bring about the changes that take place over a period of years through the joint influence of growth and such indirect instruction as everyday experience affords.

Studies of children in the elementary and high school grades indicate that pupils frequently are called upon to deal with abstract and complex problems, especially in the field of the social sciences, before they have the background of experience adequately to grasp the subject matter. When such is the case, much of what a child learns is primarily of a verbal nature, divorced from realities or practical applications to the decisions that are made in everyday life.

As children grow older, there are changes, not only in their information about affairs in the world at large, but also in their attitudes toward such affairs. Frequently there is little relationship, however, between a child's attitude (the stand which he takes for or against, the liking or disliking, prejudice or tolerance which he exhibits) and the amount of knowledge he possesses concerning a matter at issue. The child's attitudes may have their roots in emotional experiences which he is not able clearly to recall. His thinking, like the thinking of adults, will be influenced to varying degrees by his desires, his fears, and other emotional tendencies. One of the most difficult problems in education is to provide teaching that does not consist in passing adult preconceptions on to children but that stimulates children to make free use of their intelligence in meeting the problems of everyday life.

QUESTIONS AND EXERCISES

1. Make a list of your own "early memories." At approximately what age did the first experience which you can recall occur?

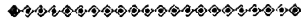
How do you account for the fact that you happen to remember the particular items on your list while other experiences at the same period of life have been forgotten?

2. What are some steps that a teacher might take roughly to determine the best length of class periods?
3. Can you think of any words, terms, or concepts which have entirely different meanings to you now than when you first encountered them in your lessons, in your school work, or in your everyday experience?
4. It has been found that children at the elementary and high school levels are frequently exposed to instruction in abstract terms which they do not understand and which are not presented in such a manner as to promote effective understanding. What steps might be taken to remedy this?
5. What are some concrete ways in which terms or concepts involved in the social studies might be made more meaningful to pupils at various grade levels?
6. What practical implications with respect to the value that pupils may gain from free discussion in classrooms at various grade levels emerge from the findings set forth in Table VII.
7. Point out what is wrong about the following proposition: It is a good policy, in teaching nature studies or natural science at the primary school level, to use the technique of personifying animals and natural events (the "Peter Rabbit" approach) since the thinking processes of young children differ from those of older persons.
8. What are your reactions to the study of the development of children's time concepts as briefly described on p. 187 and following? Do the findings seem reasonable in the light of your own experience or your observation of others?
9. From the point of view of practical implications, do findings such as those offered in the study referred to above mean that the subject matter in question should be postponed until a later time? Or that better ways of teaching should be devised for helping children to master the subject at an earlier age? Or that the basis of selection of what is included in the curriculum should be changed?
10. What, in your judgment, are some of the reasons that account for the fact that there frequently is little relationship between the amount a person knows about an issue or condition and the

degree of prejudice or partisanship he may exhibit with respect to the issue or conditions?

11. Think of changes that have occurred in your own stand or attitudes (with respect, say, to political or national policies, other nations or nationalities, the rightness or wrongness of certain acts or habits, etc.). What caused you to change your stand? To what extent did added information or experience induce the change? To what extent were you influenced by wishes or desires, or by fears and resentments, as distinguished from a rational analysis of the facts in the case?
12. Under what circumstances will added knowledge or experience be most likely (and least likely) to induce a change in attitude?
13. Describe ways in which make-believe and daydreaming may serve a useful purpose.
14. What, in your opinion, are some of the bad qualities of children's radio programs that you have heard? What values do children receive from radio dramatizations? Make a list of standards or criteria that should be taken into account to provide what you would consider to be a good radio program for children.
15. What is your opinion of the value of the "comic" magazines or booklets that children read so avidly? Do you think they are harmful? In what ways might some of the features that make the comics so attractive to children be adapted for use in school?
16. Do you think that the vicarious experiences which children derive from radio programs, comic books, and the movies are, in general, more harmful than wholesome? Give reasons pro and con. If you had complete control of these media of entertainment, would you insist that they be changed, or would you allow them to continue as they are? Give reasons for your answer.
17. What are some of the practical difficulties that are encountered in the moral training of children? What are some of the moral principles that are most likely to be taught by precept rather than by example?

CHAPTER VII



THE NATURE AND MEASUREMENT OF INTELLIGENCE

The preceding chapters have shown that children *grow* in various mental abilities and efficiency. Illustrations were given of the forms which development takes in several types of mental activity. This chapter will be primarily concerned with one of the most significant fields of work in psychology, namely, the endeavor to analyze and define intellectual activity. Underlying this work have been several purposes. One was to determine whether intellectual abilities in various lines are largely independent of each other or closely related. Stated in a different way, the question was: Is there such a thing as general intelligence or are there only many unrelated special mental capacities? A second major problem was to develop devices for measuring accurately either general intelligence or special mental abilities, or both. It was apparent that the development of a test or measure of ability, or abilities would make it possible to ascertain many types of information about mental achievement, such as the rate of mental growth, differences among individuals in intellectual power, the effects of parentage (heredity), home conditions, schooling, and other factors. It would, in fact, make possible a *science* and a *profession* of mental measurement.

TYPICAL TESTS OF INTELLIGENCE

Early Conceptions of Intelligence. The fact that individuals differ in ability to learn, to adjust to novel situations, and to manage things, people, and ideas, has been repeatedly observed throughout the course of recorded history. In the early stages of experimental psychology, beginning about 1880, efforts were made to measure more precisely some of the aspects

of intelligence. Many types of single tests, such as the completion of sentences in which certain words were omitted, the completion of pictures, the speed of recognizing figures, words, or sentences, the cancellation of letters from specified materials, arithmetical operations, etc., were suggested as possible touchstones of general intelligence. The search for a single test, guided by the belief that intelligence was a single unitary power that might disclose itself in clean-cut fashion in a single task or situation, led to but partial success.

Binet's Conception. It remained for Alfred Binet, a distinguished French psychologist, to conceive the idea that intelligence was not a single narrow quality or power measurable by a single type of test, but a complex organization of abilities. The effect of this belief was a change in the method of approach to the problem. Conceiving intelligence to be not homogeneous but possessing many aspects, Binet began a search for many types of performances or problems in which intelligent behavior should be displayed. Believing also that intelligence was largely native, although recognizing the fact that previous experience influences the results of most psychological tests, Binet began by searching for bits of information available to children in all walks of life, and for problems, puzzles, questions, mental tasks of various types that were not likely to be encountered under ordinary home or school conditions. The information he sought, then, was of the sort that every child has ample opportunity to acquire, and the problems of a type that few children were likely to have previously learned to solve.

The Binet-Simon Tests. After fifteen years of work, in part of which he was assisted by Simon, Binet published in 1905 the series of tests known as the Binet-Simon Scale of Intelligence. Stimulated by this successful achievement, a large number of extensions and revisions of the scale have been made in many countries. In America the work has been specially active, and, among the several revisions, that by Terman known as the Stanford Revision and Extension of the Binet-Simon Scale has been used most extensively since the time of its publication in

1916. In 1937, Terman, with the help of Maud A. Merrill, published a Revised Stanford-Binet Scale similar to the first revision, but embodying improvements in detail. There are two forms of the Revised Stanford-Binet. Each contains 12½ subtests and seven alternate tests, and covers a wide age range from two to fourteen years, followed by four "adult levels."

What this scale measures may be discussed more readily after examining some of the 129 tests of which it is composed. In Form I, in the group for age two are the following tasks:

1. Placing blocks in a three-hole form-board.
2. Identifying by *name* four of the six following objects: kitty, button, thimble, cap, engine, spoon.
3. Identifying three of the following four parts of a doll: hair, mouth, ear, hand.
4. Building a tower with four or more blocks patterned on one built by the examiner.
5. Naming two of a series of eighteen pictured objects such as chair, bed, shoe, clock, scissors, gun, house, etc.
6. Using together spontaneously two words such as "all gone," "baby hungry," etc.
7. Obeying simple commands, such as "give me the kitty," "put the spoon in the cup" (an alternate test).

For year ten, the following tests appear:

1. Defining at least eleven words in a list of forty-five ranging from easy to hard. Words at about the ten-year level of difficulty are: muzzle, haste, lecture, Mars.
2. Pointing out the "absurdity" in a picture, such as that of two Indians attacking a pioneer who is aiming his gun at a third who is also in sight but who is much farther away.
3. Reading a paragraph aloud in thirty-five seconds with not more than two errors and then recalling at least ten of twenty-four facts or ideas in the passage.
4. Giving "reasons": for example, giving two reasons why children should not be too noisy in school and two reasons why most people would rather have an automobile than a bicycle.
5. Naming (saying spontaneously) at least twenty-eight words (any words at all) in one minute.
6. Repeating six digits such as 4, 7, 3, 8, 5, 9.

Other Revisions of the Binet Scale. Several other revisions of the Binet Scale have been made. One, known as the Kuhlmann Revision, has been widely used, especially for very young children. Originally published in 1912, it was revised in 1922 and again in 1939.

The various Binet Scales are instruments of precision, carefully standardized, which must be given to subjects individually and which are reliable only when administered by trained examiners. Most experts on the Binet Scales believe that a reliable examiner must have, in addition to considerable general tact and skill in handling individual children, much special insight and skill which comes only from extended training and experience in using each form of the Scale.

Other Individual Tests of Intelligence. In addition to the several Binet types of scales, there are more than a score of other individual tests, that is, tests which must be administered to one subject at a time. For example, the Merrill-Palmer Scale, consisting of thirty-eight tests, was especially designed for pre-school age—from eighteen months to about five and one-half years. The Minnesota Preschool Scale has been developed in two equivalent forms for use with children from about eighteen months to five years of age.

The Van Alstyne Picture Vocabulary Test is another individual test for preschool children. It consists of a set of forty-five illustrated test cards. It is especially valuable as a rough check-up for children with limited speech facility since they merely have to point to pictures to indicate their responses. Goodenough's "Drawing-a-Man Test" is another type of individual test used to measure the intelligence of children. Intelligence is appraised by evaluating the characteristics of the child's drawing of a man. The Detroit Tests of Learning Aptitude, by Baker and Leland, used for ages three to adult level, include a wider variety of tasks.

The Gesell Schedules of Child Development measure several aspects of the maturity of infants and preschool children. With the aid of a scoring sheet, it is possible to calculate a rating of maturity for those between the ages of four weeks and

fifty-six weeks. This test covers aspects of physical and motor development as well as mentality of the Binet test type.

The Wechsler-Bellevue Intelligence Test is one of the newest individual tests. It is designed for use with subjects ten years of age or older. It is probably the most widely used individual test for measuring the intelligence of adults.

Most of these individual tests can be used reliably only by examiners who have a good background in psychology and testing, in addition to rigid training and wide experience with the particular test. Like the Binet tests, these are mainly instruments which are valid only when used by experts.

Performance Tests. There are many tests of the performance type, that is, tests which employ tracing a maze, fitting forms into a "formboard," or similar activities rather than verbal problems and answers. The Pintner-Paterson Scale of Performance Tests was the first of the type to be developed. There are fifteen form-board tests in this scale, which may be used for children from four to sixteen years. A shorter form of this scale was issued in 1937 by Pintner and Hildreth. The Arthur Point Scale of Performance Tests, suitable for approximately the same age range, consists of form-boards, picture completion, block design, and other assembly tests. The Cornell-Coxe Performance Test and the Leiter International Performance Scale are other excellent tests of similar type. The Porteus Maze Test consists of a series of pencil mazes beginning with one suitable in difficulty for the average three-year-old child and culminating with one that requires average adult ability.

The Wechsler-Bellevue Intelligence Test, mentioned in the preceding section, includes a performance test as well as a verbal test depending on language, either or both of which may be used. The performance section is especially valuable for testing a subject with limited language facility.

The performance tests, like most other individual tests, are technical instruments which can be used reliably only by a well-trained, experienced, and shrewd examiner. Other tests, however, have been developed which will enable a teacher to secure useful, even if less reliable, indications of intelligence without

extensive training in psychology and testing. These will be described in the following sections.

The performance tests are used chiefly not as a substitute for the Binet Scales but as supplements except in cases where a language difficulty, deafness, or other handicap makes the use of the Binet impossible or uncertain. Most of the performance tests, however, follow Binet in arranging a variety of problems in a range of difficulty from easy to difficult. Performance tests, especially such types as the Porteus Maze Test, measure appreciably different abilities, usually more specialized types of ability than the Stanford-Binet.

Group Tests. The tests mentioned above are all "individual tests." To provide measures of intelligence with which a large number of persons may be tested at once, at less cost and with less expert examiners, a variety of "group" tests have been developed. Teachers can learn to use these tests by careful study of the manuals provided with them and by following the directions exactly.

Group tests may be divided roughly into two types, the verbal and the nonverbal, although many include both types of material. Of the verbal tests the most famous is the "Army Alpha" test devised by a group of American psychologists and applied to more than a million and a half men in the American armed forces during World War I. During World War II another test, the "Army General Classification Test," was given by psychologists to practically all men in the armed forces—more than ten million—and a revised form is still being used in the Army. The original forms are now available for civilian use.

A test is called a *verbal* test when it requires the subject to read the exercises or solve problems given orally in words. The *nonverbal* test utilizes pictures, diagrams, geometrical figures, and other items instead of words. Both types of group tests consist typically of a series of exercises, ranging from easy to hard, printed in a booklet. Usually each test includes several different types of exercises or problems. For example, the Army General Classification Tests consist of three types of test ma-

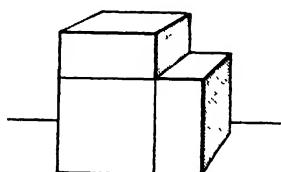
terials: (1) a test of vocabulary or word knowledge, (2) a test of ability to solve arithmetic problems stated in words, and (3) a test of estimating the number of blocks in a drawing of a pile of blocks. Following are examples of the three types taken at a rather advanced level in the series which ranged from 1, the easiest, to 150, the hardest, items.*

A PISTOL is a
 gun
 knife
 sword
 pencil

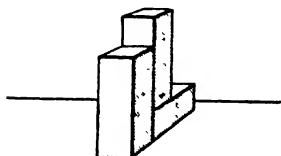
CALM means
 loud
 cross
 quiet
 thin

A square lot has two hundred feet of fence around it.
 How many feet of fence is there on one side of the lot?
 20
 50
 100
 75

Tom sold 18 pints of milk at 9 cents a quart.
 How much money did he get for the milk?
 50¢
 81¢
 \$1.00
 \$1.62



How many blocks?
 5
 4
 3
 6



How many blocks?
 3
 5
 2
 4

* These items are reproduced from the First Civilian Edition of the Army General Classification Test, by permission of the publisher, Science Research Associates, 228 So. Wabash Ave., Chicago 4, Ill.

Above are two items (a relatively easy and a relatively hard one) from each of the three types of tests comprising the Army General Classification Test given to all literate men inducted into the U. S. Army from 1940 to 1945. In April, 1945, a revised form was adopted. Note that the first two tests involve words and ability to read, whereas the third is practically non-verbal. Scores from the three tests were combined to yield a single raw score.

There are many other verbal group tests, some especially designed for elementary schools, some for high schools, some for colleges, and others for use among clerical and other occupational groups. Nonverbal group examinations have been devised to test very young children, illiterates, and others who cannot read or write words. In some of these examinations directions are conveyed orally; in others by means of pantomime. Recently group tests have been developed for preschool children, kindergarten children, the deaf, the visually handicapped, and other special groups.

There are now in use a very large number of intelligence tests, but they do not all measure exactly the same ability or abilities. They have much in common but are not identical, either in content or purpose. It is being widely recognized that to use any intelligence test validly requires experience and insight. For example, the question of whether a third-grade pupil who is a poor reader can or cannot be properly tested by a group test requiring some reading, and when a two-year-old child is sufficiently free from emotional blocking to make his best response, are nice problems which require an expert for a correct solution. If the conditions and test are not exactly right a correct measurement of intelligence cannot be assured.

Before attempting to define more exactly what the intelligence tests measure, or what exactly is meant by intelligence, it will be advisable to examine two ways in which intelligence test results are expressed and some of the assumptions underlying these expressions.

MENTAL AGE AND INTELLIGENCE QUOTIENT

The Mental Age. To make the subject's score on an intelligence test meaningful, a standard of comparison must be provided. The method adopted by Binet, and by many others later, was to use the average performances of individuals of different ages as a standard of comparison. Binet ascertained just what was the average score achieved by a representative group of three-year-old children, four-year-old, etc. It was then possible to state a child's achievement in terms of the age at which the child of average ability would secure the same score. This score is called the "mental age" or the "M.A.", sometimes written "M" for short. Thus, a particular child whose achievement in the test is equivalent to the mental age of ten years has the general mental ability of the average ten-year-old; it matters not what the actual chronological age of this child may be.

The mental age, then, gives us a statement of the general mental ability of a subject as measured by this test *at the time the test was given*, in comparison with average children of different ages. If a ten-year-old child earns an M.A. of ten, he has *average* mental ability. If he earns an M.A. of eleven years he is obviously superior to the average; if he earns an M.A. of eight years, he is markedly inferior. The mental age is really a statement of a child's mental maturity at the time, and this implies, of course, that general mental ability grows or matures. General mental ability as measured by the Binet test grows gradually and more or less uniformly to a maximum or maturity. The age of maturity has been placed variously from fourteen to about twenty-two years. The age of maturity seems to be different for different tests. Individuals, moreover, mature at different times and rates, mentally as they do physically.

The Intelligence Quotient. The intelligence quotient or I.Q., sometimes written IQ, is obtained by dividing by the chronological age the mental age received on a test like the Stanford-Binet. For example, Pupil *A* has an M.A. of 10 years and a chronological age of 10 years. Divide M.A. 10 by C.A. 10; the intelligence quotient is 1.00; Pupil *B*, whose chronolog-

ical age is also 10, has an M.A. of 12; 12 divided by 10 gives an I.Q. of 1.20, Pupil C, also 10 years of age, earns an M.A. of 8, which, divided by 10, gives an I.Q. of 0.80. Usually the decimal is disregarded; we say that *A* has an I.Q. of 100, *B* of 120, and *C* of 80. The intelligence quotient is obviously a ratio—the ratio of the mental age to the chronological age.

If the I.Q. should remain constant, or nearly so, for several years under normal conditions, it would be a useful device for two purposes. It would indicate the rate of mental growth in the future and express a person's *relative* mentality or brightness. An I.Q. of 100 would mean that the child probably has grown, is now growing, and will continue to grow in mental ability at the average rate. An I.Q. of 120 would mean a growth 20 per cent more rapid; an I.Q. of 75 would mean a growth 25 per cent less rapid than the average. Even if the I.Q. should not remain the same from year to year, it would nevertheless express the relative brightness or dullness of an individual at the time the test was given. Thus, irrespective of age, an I.Q. of 100 would mean average mental alertness, suppleness, comprehension—or whatever mentality is—whereas a higher I.Q. would indicate superiority in these respects and a lower I.Q., inferiority. It is accordingly a convenient device for picturing an important aspect of mentality. The I.Q. on a pupil's record is not *the* I.Q. but a point around which a series of further mental measurements would probably cluster.

The Point Scale. Many test-makers prefer to use a point scale rather than the M.A. and I.Q. system, especially for adolescents and adults. The simplest example of this type of standardization is the Percentile Scale. In using this method, one or more points are given for the correct solution of each exercise in the test. These credits are added up to give the total point score which is then converted into a percentile score. The percentile score is a position on a scale ranging from 0 to 100 in a special or standard group, such as a group of 10,000 high school seniors. In actual practice the 99 percentile is the highest score assigned in this group; the 90 percentile is the score on or below which 90 per cent fell; the 50 percentile is the middle

score; the 20 percentile is the one on or below which only 20 per cent fell, and the 1 percentile is the lowest score. This method is extensively used by college entrance boards, by industrial psychologists and others, but the M.A.-I.Q. plan is still most popular in the elementary school range.

Now that we have seen samples of the tasks presented in the Binet and other tests, and have observed certain facts concerning the scores obtained from such tests, we must inquire what these tests do actually measure and what intelligence is. This is a very important and difficult problem. It is important because the practical value of a test depends on knowing what it measures; difficult, because many lines of evidence, some of it highly technical, must be considered to determine what any test measures. Let us begin with a brief report of certain very technical approaches to the problem of discovering the basal characteristics of intelligence.

STATISTICAL ANALYSES OF THE NATURE OF INTELLIGENCE

Beginning at the turn of the century, or about the time Binet began his work, there have been a series of ingenious statistical studies of intelligence tests designed to reveal whether intelligence is general, operating everywhere and on everything like a single general power or faculty, or whether intelligence is specialized or even specific. Spearman in England, and Thorndike and Thurstone in America, have proposed quite distinctive views upon which much research is still being done.

Spearman's Concept of Intelligence. In 1904, Spearman announced his original theory, which held that intelligence consisted of two factors—a general intellectual factor, *g*, and several specific factors *s*. Any intellectual task consists of the operation of the general factor and several specific factors. Later, he added certain group factors which are less general, widespread, and homogeneous than *g* and more so than *s*. The group factors would be found in many intellectual activities—more than the *s* or specific factors and less than the *g* or general factor. Thus a child's ability in reading might be attributed in

part to his degree of general intelligence (the *g* or general factor), in part to such a group factor as talent for using words or verbal ability, and in part to efficiency in perceiving printed words, sensing the phonic or auditory features of words, and other abilities specific to reading. The main matter of dispute has been the general factor, in this case, general intelligence. Spearman has conceived this general factor as a form of general mental energy which would be involved in various degrees in various tasks.

Thorndike's Concept of Intelligence. Thorndike over the years has been opposed to Spearman's idea of a general, homogeneous, intellectual factor and to the notion that the basis of such a factor could be a fund or form of mental energy. He feels that this view oversimplifies the facts. He prefers a view in which intellectual tasks are carried out by a complex nervous system operating in many different total patterns—patterns too complex and varied to be fully described as mere mixtures of a certain amount of one homogeneous *g* and a number of specifics, or as a general factor plus certain group factors plus specific factors.

Thurstone's Concept of Intelligence. The third theory was recently proposed by Thurstone. By means of an elaborate type of statistical analysis, known as factor analysis, Thurstone arrived at the conviction that intelligence is made up of nine "primary mental abilities," as follows: (1) visual or spatial ability; (2) perceptual ability; (3) numerical ability; (4) logical or verbal relations ability; (5) fluency in dealing with words; (6) memory; (7) inductive ability; (8) deductive ability; and (9) ability to restrict the solution of a problem. His view is that ability in any particular activity such as understanding an article on atomic energy, solving problems in engineering, writing poetry, or selling refrigerators, or learning to do any of these activities, depends upon a combination of the nine primary mental abilities. Some of the primary abilities are more essential and function more extensively in certain skills than in others. For example, numerical ability, visual and spatial ability, and inductive ability might be more essential in learn-

ing to be an engineer than in learning to write poetry. In the latter, fluency in dealing with words and perceptual ability might be of outstanding importance.

Thurstone's primary mental abilities are general in the sense that they enter in some degree into all complex intellectual activities, but they are not regarded as types of energy as in the Spearman view. The Thurstone theory assumes that the components of intelligence can be more definitely isolated than seems to be believed by Thorndike. In fact, Thurstone feels that prediction and guidance based on knowledge of all the nine primary abilities, each considered by itself and in relation to the others, will be more fruitful than actions based on a single test of intelligence in general.

Nature of Intelligence as a Problem for the Future. It is not possible at present to decide the relative validity and usefulness of these major theories. The ultimate psychological or physiological explanation of intellect is a problem for future research by specialists. In practical work in education, the test of intelligence rather than tests of a number of primary mental abilities, is almost exclusively used. A vast amount of information concerning the practical significance of score on the Stanford-Binet and other tests of intelligence in the life of the school and society is now available. For the present, this is the information which the educator should master first.

We shall try to provide at least a general understanding of intelligence, first, by offering a preliminary "common sense" definition; second, by giving results of studies designed to reveal the extent to which intelligence is affected by heredity on the one hand and environmental factors, such as home and school life, on the other; third, by giving some of the results obtained from using the intelligence tests and comparing results of scores on such tests with abilities shown in school work in general and in special school subjects, and in other phases of life; and finally by considering intelligence tests in comparison with tests of "special aptitudes" such as talent for music or reading.

A DEFINITION OF INTELLIGENCE

Let us approach a definition of intelligence by considering the test elements of such a scale as the Stanford-Binet and merely noting what they seem to measure.

Among the 129 tests in the Revised Stanford-Binet Scale are many which measure the ability to manipulate, mentally, familiar facts, such as repeating digits or saying words which come to one's mind, and to reason out the solution of problems that utilize the facts of arithmetic, of physical relations, and of practical situations. In some tests, the knowledge of abstract facts and relations is demanded; for example, in defining such words as pity, revenge, charity, envy; in giving the similarities in three things, such as wool, cotton, leather; in explaining the differences between laziness and idleness or between poverty and misery; in grasping the thought contained in a short paragraph, or in giving the meaning of pictures or fables.

In general, the Binet test seems to include a variety of tasks on which depend the mental abilities to be described later in our chapters on learning, the acquisition of ideas, especially abstract ideas, and reasoning or problem solving. Indeed, it appears that the aims of Binet and his followers were precisely to secure tests of various abilities to learn, especially to learn complicated and abstract facts, and also to profit by experience in a general way. They tried to secure tests that would indicate ability to adapt oneself to new situations, to see the problem, hold it in mind, and reason out the solution. In these tasks, it is assumed that mental alertness, keenness, quickness, and breadth of grasp, as well as suppleness, accuracy, and control, would be involved.

Intelligence, then, may be defined as *a composite or organization of abilities to learn, to grasp broad and subtle facts, especially abstract facts, with alertness and accuracy, to exercise mental control, and to display flexibility and ingenuity in seeking the solution of problems.* These abilities were conceived to be native by Binet, Terman, and many others. This fact is

shown by Binet's effort to secure in his scale the kind of problems that were based upon facts that practically all children would have ample opportunity to learn under reasonably normal conditions, but problems that no, or few, children would have been trained to solve in exactly the way they were presented in the tests. By trying to avoid the influence of special home or school training in this way, Binet hoped to reveal native intellectual aptitude and capacities. To what extent intelligence as measured by the Binet Scale and other tests is native is a matter of dispute which we must take up for more extended consideration.

We return, though, to the definition suggested above. It should be noted that this statement defines intelligence in terms of mental abilities. Intelligence, thus defined, does not include temperament, character, personality, emotional control, stability, level-headedness, wisdom, dependability, and other personality and character traits about which teachers are justifiably greatly concerned.

It should be understood that the definition is a general, indeed a "common-sense" one. Its purpose is to give the reader a general idea of what the test measures. The experts in the field have suggested many other definitions, many of them briefer. All such definitions are of less value to the teacher than the understanding of the relationships of scores on the intelligence tests with various school, vocational, and other abilities, to which we shall turn our attention in the next chapter. Of greatest importance, moreover, are the results of the studies conducted to determine the extent to which the score, such as the I.Q., on the intelligence tests is due to heredity or environment. This question will be considered next.

INFLUENCE OF NATURE AND NURTURE ON INDIVIDUAL DIFFERENCES IN INTELLIGENCE

That the effects of heredity and environment are interwoven from the time of birth, that they cannot be isolated and studied in pure form, is now generally agreed. On the question, What is the relative effect of heredity and environment on

intelligence and other human characteristics? there is, however, great disagreement. This is largely due to the fact that experimental approaches to the problem must be indirect, and each type of approach leaves certain important factors in a state of uncertainty. It will therefore be advisable to give a few illustrations of the types of study undertaken.

Resemblances between Parents and Children. The common saying that "brains run in families" is based upon the practical observation that in almost any community one can find parents and children who similarly have high or low intelligence. Examples of this sort are quite impressive, as are the many detailed genealogies that show high ability or feeble-mindedness appearing in each of several generations. Exceptions to such resemblances between parents and children can also be noted, however, and they can be accounted for by current theories of heredity. Since a reporting of examples is not adequate evidence, many careful studies have been made to determine the extent to which children resemble their parents and other ancestors.

Resemblances Often Studied by Statistical Correlations. One means of measuring the resemblance between parents and children is to find the statistical "correlation" between their scores on mental tests. A word about correlation is in order, since the term will recur in the ensuing discussion. This statistical procedure yields what is known as a "coefficient of correlation." The coefficient, which may range from a negative value of -1.00 to a positive value of $+1.00$, gives a quantitative indication of the extent to which two factors are correlated. If fathers and sons, for example, always had precisely the same intelligence, then a correlation between the scores of any normal sampling of fathers and their sons would be $+1.00$. If there were no relationship at all between the intelligence of fathers and sons, the correlation between paired members would be zero. If sons were always bright or dull in inverse proportion to the brightness or dullness of their fathers, the correlation would be -1.00 . Coefficients of correlation are not percentages. They have meanings all their own which the stu-

dent can probably understand best by comparing with each other those cited in the following discussions.

Correlation Does Not Imply Causality. If two factors are causally related, so that a given degree or magnitude of one is associated with a corresponding degree or magnitude of the other, there will be a positive correlation between measurements of each factor; but a correlation does not necessarily mean that one factor is the cause of the other. For example, since the corn crop is usually good when there is plenty of rain, the average yield per acre in a given county for twenty years is likely to show a high correlation with average rainfall during the corresponding years. The correlation is not likely to be perfect ($+1.00$), however, since many other factors such as temperature, the evenness of distribution of rain during the growing season, etc., will also affect the crop. It is possible that a positive correlation would also be found between the annual corn crop and number of mosquitoes; this cannot be interpreted to mean that the corn caused the mosquitoes or the mosquitoes the corn—the relationship may be due to the fact that the crop and mosquitoes both are causally related to the rainfall or some other factor.

Pearson's Study of Parent-child Resemblances. The method of correlation was first applied extensively to the measurement of resemblances between blood relatives by Pearson in 1904.¹ When parents and children were compared on the basis of a number of physical characteristics, the resulting correlations were about $+.50$. When parents and children were compared with respect to their scores on measurements of certain mental operations, the correlations also clustered around $+.50$. This figure represents a moderate, but far from perfect, resemblance, and Pearson therefore concluded that physical and mental characteristics in men are inherited "within broad lines, in the same manner and with the same intensity."

Other Investigations of Parent-child Resemblances. Since the time of Pearson's studies, numerous similar investigations have been made, utilizing standardized intelligence tests. In one such study (by Conrad and Jones),² father-son, father-

daughter, mother-son, and mother-daughter comparisons were made on the basis of tests of about a thousand persons, representing 269 family groups that constituted a cross section of a New England community. The parent-child correlations clustered about $+ .50$. Other studies have likewise found correlations of about this magnitude, sometimes somewhat lower, seldom much higher.

Resemblances between Siblings and Twins. Correlations varying from about $+ .35$ to $+ .50$ have also been found in comparisons between siblings (brothers and sisters who are not twins) living in the same house. Comparisons between twins are especially interesting, since twins can be classified into two groups, *identical* and *nonidentical*. Identical twins (also called *uniovular* and *monozygotic*) are believed to develop from the same fertilized egg, while nonidentical twins develop from two separate fertilized eggs and therefore, as far as original germ plasm is concerned, are as distinct as brothers and sisters who are born at different times. If heredity were a potent factor, one would expect a considerably higher degree of resemblance between twins that apparently have developed from the same ovum, and therefore presumably have the same heredity, than between nonidentical pairs. This has been found to be the case. Correlations of $+ 0.80$ or higher have been found in comparisons between identical twins reared in the same environment. On the other hand, correlations between nonidentical twins tend to fall in the range of $+ .50$ to $+ .70$, which is about midway between the range for identical twins ($+ .80$ to $+ .90$) and the range for ordinary brothers and sisters ($+ .35$ to $+ .50$).

Resemblances between Relatives Living Apart and Non-relatives Living Together. The findings cited above concern children living together with their own parents and therefore sharing the same general environment. In these cases, the influence of heredity is obscured by the role of similar environment. In comparisons made between blood relatives who have been reared in different environments, it has been found in most studies that resemblances will appear. This fact suggests that heredity contributed to the resemblance normally found

between blood relatives. There has been considerable disagreement, however, as to the relative effect of the heredity factor in the production of the observed similarities.

Cases have been noted in which identical twins who have been reared apart show an almost incredible resemblance to each other in mental ability and other characteristics. Dissimilarities have also been noted, however, in many cases. Although findings in different studies have varied somewhat, it appears that, barring accidental happenings or extreme deprivation, identical twins reared in different home environments are likely to show a higher resemblance in intelligence than is shown by siblings living in the same house. This fact suggests that heredity is a potent factor.

Numerous studies of resemblances between foster parents and their foster children, who live in the same home environment but do not share the same immediate heredity, have been undertaken to weigh the relative influence of heredity and environment. Several factors complicate the interpretation of the results of such studies. One is the effect of planning and selection which is usually involved in the placement of a child for legal adoption. For example, the babies who seem to be most promising (as judged by the child's manifest characteristics and information concerning his true parents) are more likely to be placed on the adoption lists than those who are clearly defective. To the extent that such selection prevails, the average intelligence of children actually adopted would be superior to that of the total available group. Furthermore, effort is often made to "fit the child to the home," to provide, for example, a baby who is "college material" for a home in which the foster parents are college graduates and are engaged in one of the so-called learned occupations. To the extent that such selective placement prevails there will be some resemblance between foster parents and their foster children quite apart from the effect of the common environment.

In one carefully controlled study (by Burks)³ that included measurements of "own" children living with their families and of foster children who had been placed in the adoptive homes

at an average age of three months, it was found that the correlations between parents and their own children were higher than the correlations between parents and foster children. Burks estimates that heredity accounts for as much as from 75 to 80 per cent of measurable differences in intelligence. In another study (by Leahy)⁴ it was also found that correlations between "own" parents and children were considerably higher (clustering around .50) than between foster parents and foster children (clustering around .20). Moreover, the results indicated that even these relatively low correlations between foster relatives were influenced to a large degree by the factor of selective placement. The effects of the foster home environment appeared to be considerably greater in other studies. In one, for example (by Freeman, Holzinger, and associates),⁵ it was found that foster children showed gains after adoption and that such gains were larger in the case of children placed in the better homes. In another study (by Skodak)⁶ children who had been living in foster homes showed a higher average level of intelligence than might have been expected in the light of such information as was available concerning their true parents.

In individual cases, a foster child may show a high level of intelligence that seems to be quite out of line with such facts as are known concerning the abilities of his true parents. However, it also is true that large discrepancies sometimes appear between parents and their own children who live in the same environment. It should be repeated, however, that such discrepancies can be accounted for in terms of heredity. When a foster child thus outstrips his true parents it is, therefore, rarely possible to determine definitely whether the foster home environment enabled the child to capitalize upon inborn potentialities or whether the favorable environment provided by the foster home produced a genuine gain in intellectual capacity.

The Effect of Nursery School and Kindergarten Experience on the I.Q. The question as to the possible influence of the environment assumes concrete significance when we inquire into the effect of a child's schooling on his level of intelligence.⁷ In some such studies, children who have attended nursery

school have revealed gains as shown by retests and by comparison with control groups of nonattenders. In numerous other studies, no significant gains have been found that could be attributed to nursery school experience. When children of preschool age have been exposed to repeated tests, it frequently is found that the group average on the final test of a series is higher than the average on the first test, but such gains also have sometimes appeared in the case of retested control groups.

In the studies in which nursery school experience seems to have produced gains, such advances have generally been larger in the case of younger children within the preschool range than in the case of older children and have been more pronounced during the first year of attendance than during the second or later years. Further, the gains have been found to occur primarily (but not exclusively) among children who were near average or below average rather than among the brightest children in the particular group.

One of the studies^{*} in which nursery school experience is reported to have produced gains in I.Q. was conducted in a large orphanage in which a nursery school was established that was attended by some children but not by others. The conditions in the orphanage were generally quite unfavorable as compared with the average home. One comparison shows that children who attended the nursery school for average periods of about twenty weeks showed an average gain of 4.6 points of I.Q. while control subjects showed an average loss of the same amount during the same period. In general, one would expect nursery school to be more beneficial to children coming from poor, intellectually unstimulating environments than to those coming from better conditions.

Significance of I.Q. Gains in Young Children. When gains in I.Q. do appear after nursery school attendance, there is the question as to what the gains really mean: To what extent do they represent a genuine increase in the child's intellectual stature? To what extent do they betoken a mobilization of inherent powers that were there from the beginning? To what

extent are the gains simply a by-product of unreliabilities in the mental tests for very young children? Intelligence tests at the preschool level are not as reliable as are tests at later age levels.⁹ A child may, for example, be uncooperative when he is tested the first time and his low score may not at all represent his real ability; then, after having had experience with the nursery school locale, routine, and personnel over a period of some months, he may show a high degree of cooperation on a later test and earn a considerably higher score. In a study by Rust¹⁰ it was found that by virtue of lessened resistance through further contact with the examiner, individual children showed gains of as much as thirty-five points of I.Q. within a few days. In another study,¹¹ McHugh found that many children in a group of ninety-one who were tested before and at some time after entering a school at an average age of approximately five years showed gains in I.Q. on the Stanford-Binet; but these gains could be mainly accounted for by mere increase in their willingness to loosen up and talk freely in the test situation. The gains resulted from learning how to adjust better to the test situation, which they were able to do after a short time in the school. In these two studies the gains do not mean that the child has become correspondingly brighter in general; they represent merely better adjustment to the test situation.

Inasmuch as these gains, which we may call "adjustment gains," differ greatly from child to child, it is apparent that the use of individual mental tests requires considerable technical knowledge, wide experience, and shrewd judgment on the part of the examiners. We are now rapidly finding out what factors produce variations from the true or representative performance on the intelligence tests, and when they are expertly taken into account, more reliable appraisals of intelligence are secured.

Effect of Different School and Out-of-School Environments on the I.Q. Apart from variations in the home environment, there are large variations also in the intellectual environment afforded by children's companions, their teachers, and the programs of the schools they attend. According to one study of in-

stitutional children,¹² for example, a child's I.Q. will tend to decline or to rise somewhat toward the level of his group after he has spent some time with children whose intelligence is lower or higher than his own. Lorge found evidence that students who pursued high school and college work tended to increase their scores on intelligence tests in comparison with young people who left school earlier.¹³ Although an effect of this sort might conceivably occur, it does not follow that a child's I.Q. is entirely at the mercy of his everyday environment. As Hollingworth has shown in her studies of gifted children, bright children frequently forge ahead in their intellectual development, show extremely high I.Q.'s, and acquire precocious intellectual interests, even though they have been born into poor circumstances and have spent several years in classes with children of average intelligence, sometimes under unsympathetic teachers. In like manner, as can be noted in observations of children in everyday life, a dull youngster may spend many years in the society of people who are considerably brighter than he and still maintain much the same I.Q. from year to year.

Influence of the Elementary School Program on the I.Q. Of special interest from an educational point of view is the question whether schools and educational programs at the elementary school level might differ in their "intellectual stimulus value" so that a child might show a rise in I.Q. if he attends one school and might merely hold his own, or even show a loss, if he attends another. The limited evidence on this question indicates that the differential effect of the general run of school programs is likely to be small. In one study it appeared that schools differed in their stimulus value as determined by remeasurement of pupils who had attended them over a period of time.¹⁴ In a study by R. L. Thorndike and his associates,¹⁵ comparisons were made between the initial and terminal I.Q.'s of children who had spent two or more years in three outstanding schools. In two of the three schools, there were no significant changes in the average I.Q.'s of the pupils. In the third, the pupils showed an average gain of six points, but the in-

investigator could not ascertain to what extent this increase might represent a true gain that could be attributed to the educational program and to what extent it might be due to fortuitous circumstances, such as the fact that the mental testing program in the school where the gains appeared was less systematic than in the others. Whatever was their cause, the gains did not appear to be cumulative, for the increase in the average was just as large when the initial scores were compared with retests after one year of attendance as it was when initial scores were compared with retests after longer periods of attendance.

SOME MISUNDERSTANDINGS AND VALID CONCLUSIONS REGARDING THE NATURE OF INTELLIGENCE AND INTELLIGENCE TESTING

The I.Q. is only Roughly Constant. Although studies of the effects of heredity and environment on the I.Q. and studies of the constancy of the I.Q. from year to year are not entirely in harmony, it may now be said that, except for occasional exceptional cases, intelligence as we defined it tends to remain constant—not constant to an exact I.Q. point, such as 95, but to fall, on the average, within a range of about ten points. Most of the big changes in I.Q. are the result of such factors as unrepresentative performances on the test by a subject, especially very young ones, and others tested in a strange place, or when they are distressed, fearful, or resistant; unreliability in the test itself; incompetence of one or more of the examiners, or the use of different types of tests in the series of repeated testings. In general, in the case of pupils retested annually after a month or more of experience in the first grade by the Stanford Revision of the Binet Scale, the I.Q. will remain, with some exceptions, in a range of ten points. The typical pupil will not always get an I.Q. of 95 or 120, but his I.Q.'s will fall, with rare exceptions, in an area around 95, roughly between 90 and 100 in the one case, and around 120, varying from 115 to 125, in the other. The intelligence test expertly used, then, indicates a fairly limited area in which the pupil's real I.Q. lies. To know the area on the I.Q. scale is of great value in the education and guidance of pupils.

The Need of Caution in Making Practical Uses of Intelligence Test Scores. It should be noted, however, that changes of ten or more points do appear between tests repeated at an interval even when such a test as the individual Stanford-Binet is used. Repeated tests with group instruments usually reveal larger differences. Although such changes cannot be safely regarded as always indicating corresponding gains or losses in basic intellectual capacity, they nevertheless show the necessity of exercising great caution in making vital decisions concerning a pupil's present educational treatment and future prospects. This is particularly true when different group tests are used. Every expert examiner knows that if he gives each of several different group tests on successive days, the I.Q. of many pupils will jump about right merrily. These facts all point to the need of caution, an expertness in the use of intelligence tests for anything except very rough and tentative appraisals.

The Importance of Expertness in Intelligence Testing. It is now recognized that expertness in the use of intelligence tests requires extensive training in psychology in general as well as in testing. It demands extensive training in the use of tests and appraisals of all other phases of personality and behavior. In addition, extensive practical experience in testing and observing children and natural shrewdness in sizing them up are necessary. Such an expert can do a great deal to detect and allow for the many factors which affect a pupil's performance in an intelligence test. Indeed, the real expert regards the individual intelligence test period as similar to the physician's diagnostic examination. He probes for a number of factors, he takes into account the subject's past history and observes his present condition and activities carefully, and he arrives at a general appraisal not only concerning his intelligence but also concerning various phases of his personality.

Limitations of Group Intelligence Tests. There are many different kinds of group intelligence tests. They vary in purpose and in merit for any specific purpose. Some are devised primarily to give only a very rough estimate of the individual's status, whereas others are long, thorough, and relatively re-

liable. In general, however, special caution should be exercised in interpreting the results of I.Q.'s based on typical elementary and high school group tests. Caution is needed partly because group testing does not permit even the expert examiner, much less the less experienced tester, to question and observe the individual and to take into account factors which may be conditioning his performance. Where individual examinations by experts cannot be secured, a single group test score should be regarded as a very rough approximation. Under these conditions, tests should be repeated at intervals and the trend of the several scores noted.

Misunderstandings concerning Heredity and Environment. Discussions of the relative influence of heredity and environment on intelligence frequently have involved much controversy and dogmatic statements of extremist viewpoints. Likewise, the problem has sometimes been confused by irrelevant issues, such as the assumption that those who emphasize the importance of heredity are "reactionary" while those who emphasize the environment are "liberal" or "progressive." Actually, of course, such labels have no place in an issue that should be decided by objective findings. Although an extreme environmentalist position is likely to win much popular applause, it may do much damage. It may raise false hopes and place demands upon parents and teachers that cannot be fulfilled. The assumption that a sufficiently stimulating environment can raise a child from a dull or average to a superior level may lead ambitious parents and teachers to overstimulate and overdrive children to a serious extent. It may lead a child's elders to blame themselves or the teachers if a child maintains approximately the same I.Q. from year to year. An extreme hereditarian position likewise is damaging if it is accompanied by snobbery, class consciousness, and denial of opportunity to each person, or the lack of respect for what excellent guidance and education can accomplish without increasing the I.Q. It would be especially unwholesome if accompanied by the view, which the facts do not justify, that every child's I.Q. can be determined once and for all time when he enters school. To

regard the I.Q. as the sole criterion for the classification of pupils or for the provision of educational opportunities is likewise an unsound educational practice, as will be pointed out more fully later in this book.

The Facts of Heredity Not a Negation of the Possibilities of Education. A few additional words should be offered to the occasional teacher who may declare, "What is the use of teaching if I cannot increase the intelligence of my pupils?" Such a teacher should realize that "intelligence" as used in this discussion is not the same as achievement—as abilities, information, skills, attitudes, ideas, ideals, purposes, personality development, and other results of teaching and learning. By intelligence we mean, as stated above, a pupil's basic capacity to learn; his brightness, the speed and breadth of his intellectual grasp. While a pupil with an I.Q. of 125 can learn more rapidly and on a more complex level than one with an I.Q. of 100, both can acquire an enormous amount of useful information, skills, attitudes, and purposes, and the more definitely a teacher recognizes and makes adjustments to the different capacities and needs of the two pupils, the more fruitful his work will be for both. The fact that the I.Q., within certain limits and with certain exceptions, tends to remain constant does not imply that teaching is futile; on the contrary, it implies that it is possible for a teacher to learn how to teach each individual with the maximum fruitfulness.

Both Heredity and Environment are Potent. The discussion above brings out the point that both heredity and environment play an important role in determining human capabilities. Inherited potentialities reach their fruition only through the environment. In cases of severe environmental deprivation, an individual's score on an intelligence test will fail to represent his potential ability, and his score may rise in a more auspicious environment. In the case of children from the general run of homes in an average community with average educational and cultural opportunities, the likelihood is small, according to the weight of present evidence, that there would be a very sub-

stantial increase in average intelligence, as measured by current tests, if children were shifted to presumably better homes or if special educational provisions were made.

Wide Variations in Intelligence in the Same Family. The fact that there is a correlation of around $+ .50$ between parents and offspring should not be misinterpreted. It is true that parents with high I.Q.'s tend to get bright children, whereas parents with low I.Q.'s tend to get dull children, and average parents, average offspring. But the correlation is not perfect; it is only $+ .50$. If you examine several thousand offspring of parents with high I.Q.'s you will find that they show a high *average* intelligence, but you will find they show a very wide range all the way from idiocy to genius. Examine thousands of the offspring of parents with low I.Q.'s and you will find a low average, but a distribution from idiocy to very high I.Q.'s. There will be many, many more high I.Q.'s among a hundred thousand offspring of parents with high I.Q.'s, but there will be a good many among the children of average parents, and a considerable number in the families of dull parents. Every so often, a very bright child will appear in a family of dullards, and equally often a dullard will appear in the family of bright parents. Heredity plays a powerful role but the variations of offspring from the average of the parent's status is so great that we can never assume that a particular child will certainly be like his parents.

There are more bright children produced by average and dull parents than by bright parents merely because there are so many more average and dull parents than bright ones. That this is actually the case was shown by an extensive study, the Carnegie Study.¹⁶ A wise society will determine the intellectual capacity of all its young members and provide the optimum education for each. Since the school is the one agency that seems equipped to appraise the intellectual capacities and needs of its youth, it is the teachers' responsibility to learn more about intelligence testing. The next chapter will therefore be devoted to the topic.

SUMMARY

We have by no means canvassed all of the facts of importance in determining the fruitful professional uses of intelligence tests. Many of these will be presented in the next chapter. Before turning to it, we may briefly summarize the important findings in the present chapter.

The intelligence test was developed to meet the urgent need for a relatively simple measurement of general mental ability or capacity.

Since the beginning of the present century a large number of intelligence tests have been developed for different purposes: carefully worked out individual tests for children of different ages; group tests for all ages; and special tests for deaf pupils, persons unable to speak English, unable to read, and so forth.

Most individual intelligence tests can be given reliably only by well-trained and experienced specialists, but there are many group tests which an intelligent teacher can learn to use profitably. The individual test, expertly given, is, however, more valid.

Certain methods of expressing intelligence, such as the mental age or M.A., and the intelligence quotient or I.Q., have become widely used. The M.A. is the measure of level or maturity of mental development; the I.Q. is a ratio which compares a person's status with the average of the same age. It is often called the "brightness" measure. Percentile scores and other point scales are now coming into use especially for adult subjects.

Although no single technical definition of intelligence has been accepted, the following is suggested as a practical conception of intelligence for the educator: *Intelligence is a composite of many abilities to learn, to grasp broad and subtle facts, especially abstract facts, with alertness and accuracy; to exercise mental control; and to display flexibility and ingenuity in solving problems.*

In general, it is found that parents of high intelligence tend

to have offspring of higher intelligence than do parents of low intelligence, and vice versa. Parents of superior intelligence, however, tend to be of superior economic status and provide a better environment, both home and school, than parents of inferior intellect. Consequently their children have the advantage both in heredity and environment. This is the *general* rule; but there are many exceptions. The correlation of the I.Q. of parents and offspring is about $+ .50$ —which means a fair but far from perfect relationship.

Very high I.Q.'s will occur in families of average intelligence and less often in families of very low intellects. Likewise, very low I.Q.'s will appear to a certain extent in the families of average I.Q.'s and much less frequently in the families of very high intelligence. It is, therefore, obvious that the intelligence of any particular child cannot be foretold from knowledge about his parents or his home environment. It must be determined by some practical test. This, of course, is the reason for developing and using intelligence tests. Among our school populations are enormous numbers of bright children capable of doing college work whose parents lack the means for financing college education for them.

Although under typical conditions of a representative American home and school life the I.Q. of the *majority* of children remains within a fairly narrow range from the first grade onward to the end of schooling, there are instances of large changes. Large gains may be due to removal of emotional blockings or other interferences with maximum performance in the test or to improved education or to other factors, and losses may be due to the opposite changes. In some cases, even the experts are puzzled to account for the shifts. I.Q.'s taken before entering school, especially in infancy, are even more likely to vary on later tests, due in considerable measure to the fact that tests for infants and very young children depend much more on motor coordination, manipulative skills, etc., than do the tests for older children. For these reasons, it is no longer safe to assume that a person's I.Q. can be determined exactly once and for all by a single test, even if the test is given by a

shrewdly expert examiner. The importance of the I.Q. is so great that it should be redetermined from time to time by an experienced examiner. When this is done the *area* of the I.Q. can be quite accurately determined.

The practical use of intelligence tests depends upon other facts to be presented in the next chapter. A more complete discussion of the uses of intelligence tests in education will not be undertaken, therefore, until these data have been considered.

QUESTIONS AND EXERCISES

1. What are the differences between a verbal and a nonverbal test? Which of these two types of tests is likely to be more influenced by a typical American school program?
2. What is the difference between mental age and the intelligence quotient?
3. In what respects, if any, does the "common-sense" definition of intelligence given in the text differ from your own notion of what intelligence is?
4. It is quite well established that, in general, the children of well-to-do parents have higher I.Q.'s than children of poorer parents. Just what conclusions can we draw from this fact concerning the influence of heredity and environment upon the I.Q.?
5. Now that you have read the brief summary of data bearing on the influence of heredity and environment upon intelligence as given in the text, how would you summarize briefly the present status of this problem? Do you feel, in general, that the situation is rather clear, or is it still very uncertain?
6. During what years would you think teaching and environment would have the greatest effect upon the I.Q.? Why?
7. Of the various studies on the environment-versus-heredity controversy reported in the text, which ones do you consider more important? Which ones less important? Why?
8. What position, precisely, does the text take concerning the question of the constancy of the I.Q.?
9. Following are definitions of intelligence offered by other writers. Which of these are most serviceable and valid?
 - a. "The general capacity of an individual consciously to adjust his thinking to new requirements."—Stern.

- b. "An individual is intelligent in proportion as he is able to carry on abstract thinking."—L. M. Terman.
 - c. "To judge well, understand well, reason well, these are the essentials of intelligence."—Alfred Binet.
 - d. "Intelligence seems to be a biological mechanism by which the effects of a complexity of stimuli are brought together and given a somewhat unified effect in behavior."—Joseph Peterson.
10. Basing your opinion on the facts presented in the chapter, does it appear that the definitions above are too broad or too narrow to *define* what the present tests actually measure?
 11. Aside from tests, what features or kinds of behavior disclose in some measure the degree of a person's intelligence? For example, are table manners or English usage indicative of intelligence?
 12. In which of the following types of work is a high degree of intelligence probably useful or necessary: driving an automobile, fishing with nets, splitting wood, taking shorthand dictation, barbering, preaching, teaching, running a riveting machine, writing poetry, selling toy balloons, selling bonds? In which of these activities are traits other than intelligence important? What traits?
 13. What services could an expert in intelligence-testing render to the work in: (a) a juvenile court; (b) a hospital for neurotic children; (c) a public school; (d) a criminal court; (e) a home for orphans; (f) an automobile factory; (g) a large department store, (h) an immigration bureau; (i) the army or navy?
 14. Explain in some plausible way the fact that intelligent people, on the whole, are less conceited than dull people are.
 15. A boy of 10 with an I.Q. of 140 would have what mental age? A boy of 14 with an I.Q. of 100? In what respects would these two boys resemble each other or an adult with an M.A. of 14? In what respects would the three be very unlike?
 16. When a person's I.Q. becomes higher or lower on a retest, does it necessarily mean that his intelligence has changed correspondingly?

- and Preschool Tests in the Measurement of Intelligence," *Journal of Psychology*, 1938, 8, 351-379.
10. M. M. Rust, *The Effect of Resistance on Intelligence Test Scores of Young Children*, Child Development Monographs, Teachers College, Bureau of Publications, 1931, No. 6.
 11. G. McHugh, *Changes in I.Q. at the Public School Kindergarten Level*, Psychological Review Monograph, Vol. 55, No. 2.
 12. B. Wellman, "Guiding Mental Development," *Childhood Education*, 1938, 15, 108-112.
 13. I. Lorge, "Schooling Makes a Difference," *Teachers College Record*, Vol. 46, No. 8, May 1945, pp. 483-492.
 14. B. L. Wellman, "Growth in Intelligence under Differing School Environments," *Journal of Experimental Education*, 1934, 3, 59-83.
 15. R. L. Thorndike, C. W. Fleming, G. Hildreth, and M. Stanger, "Retest Changes in the I.Q. in Certain Superior Schools," *Thirty-Ninth Yearbook of the National Society for the Study of Education*, Bloomington, Ill., Public School Publishing Company, 1940, Part II, pp. 351-361.
 16. W. S. Learned and B. D. Wood, *The Student and His Knowledge*, Carnegie Foundation for the Advancement of Teaching, 1938.

CHAPTER VIII



THE PRACTICAL USES OF INTELLIGENCE AND APTITUDE TESTS

In the preceding chapter we discussed the development of intelligence tests and the meaning of mental age (M.A.) and intelligence quotient (I.Q.). In the present chapter, we shall make further inquiries about the practical significance of intelligence tests before giving suggestions for using them in schools. The first question to be raised is: How well does the intelligence test score correlate with and foretell general achievement in various school subjects and in other activities?

THE RANGE OF INDIVIDUAL DIFFERENCES IN INTELLIGENCE

Before taking up the correlations of intelligence and achievement in various lines, we should show the character of individual differences in terms of the measures obtained from the Binet tests. The most convenient way is to show the distribution of I.Q.'s obtained on the Stanford Scale, the most widely used revision of these tests.

The curve in Fig. 6 shows the distribution of I.Q.'s found among 2,904 children selected by Terman and Merrill to form the standardization group for the Revised Stanford-Binet Scales. Adjustments in the means of the various age groups have been made to correct for too large a selection of subjects from the upper socioeconomic levels. Generalizing from such data as these, it is estimated that the distribution of intelligence, as measured by the revised Binet Scales, in the population at large is about that given in the table on page 248.

Keeping in mind our provisional definition of intelligence as a composite measure of capacities to learn, to grasp broad and subtle facts with alertness and accuracy, to generalize and

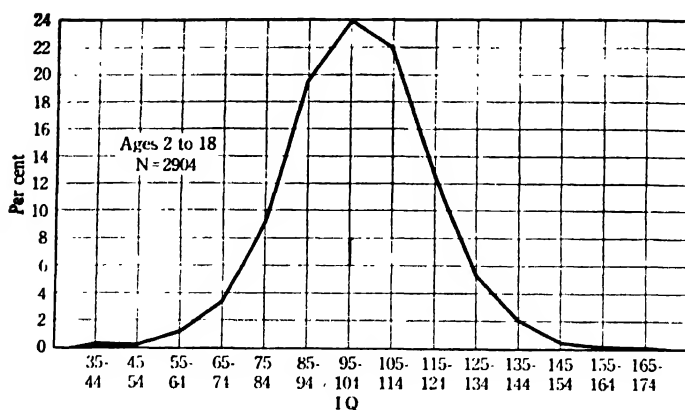


FIG. 6. DISTRIBUTION OF COMPOSITE L-M I.Q.'s OF THE STANDARDIZATION GROUP

This figure gives the distribution of the composite of the adjusted Form L-Form M I. Q.'s for the standardization group in terms of the per cent of cases at each of the ten-point I.Q. intervals. This is probably the clearest picture available of the intellectual differences among American born white children two to eighteen years of age. (Reproduced by permission from L. M. Terman and Maud A. Merrill, *Measuring Intelligence*, Houghton Mifflin Company, 1937, p. 37.)

TABLE X

PERCENTAGE DISTRIBUTION OF COMPOSITE L-M INTELLIGENCE QUOTIENTS OF THE STANDARDIZATION GROUP (2904 CHILDREN)*

Classification	I.Q.	Percentage of All Children Included
Very superior	160-169	0.03
	150-159	0.2
	140-149	1.1
Superior	130-139	3.1
	120-129	8.2
High average	110-119	18.1
Normal or average	100-109	23.5
	90-99	23.0
	80-89	14.5
Low average	70-79	5.6
Borderline defective	60-69	2.0
Mentally defective	50-59	0.4
	40-49	0.2
	30-39	0.03

* Adapted from M. A. Merrill, "The Significance of the I.Q.'s on the Revised Stanford-Binet Scales."¹

display ingenuity in reasoning and problem solving, we may now seek to determine more exactly the relation between intelligence and various forms of achievement.

INTELLIGENCE AND SCHOLASTIC ACHIEVEMENT

Inferior Intelligence. Intelligence quotients of 20 or less are found infrequently. Persons with I.Q.'s in this range are "idiots," essentially incapable of learnings. Individuals with I.Q.'s from 20 to 25 to 50 or so are ordinarily called "imbeciles." All within this range are capable of but meager learning and adaptability. In the I.Q. range from 50 to 70 are found various degrees of "feeble-mindedness" or "mental defectives," which grade quite imperceptibly into the less, but nevertheless seriously, dull individuals above, often called "borderline defectives." Throughout this enormous range, from approximately 0 to 70 I.Q., there is absolutely no doubt about the limitations upon the acquisition of complex mental functions, and the rate of acquisition where learning is possible at all. It is almost invariably futile to attempt to teach children of I.Q.'s less than 50 to read, spell, or do arithmetic. Genuine comprehension in reading and arithmetic can seldom be achieved even by those whose I.Q.'s fall between 50 and 60, and the little they do learn must be the result of arduous and prolonged application.

In the average case, an I.Q. of 75 is considered about the minimum essential for appreciable achievement in the "academic" portions of school work, but many with that degree of intelligence fail almost entirely, and, at best, progress is slow and soon halted. In the schools most of the pupils recognized by teachers as "very dull" and "very slow" will be found to have I.Q.'s between 70 and 85. Most of these children are retarded in their school progress.

Children with an I.Q. within the range 85 to 95 have difficulty keeping pace with the typical class, but as Burt² found among London children those with I.Q.'s in this range tend to achieve the most in proportion to their innate ability. "There is discernible an effort, and an effort by no means sterile, to

worth.⁷ E---, in 1916, was a boy eight years and four months of age, with an I.Q. of 187, and in grade eight.

In addition to this regular school work the child has covered the following special work in language and mathematics, either with a tutor or with his mother: Geometry, algebra, as far as equations; Latin, partial knowledge of the four declensions (he has been taught by the direct, informal method, and reads easy Latin); Greek—worked out the alphabet himself from an astronomical chart, between the ages of five and six years; French, equal to about two years in the ordinary school; German, ordinary conversation; Spanish, attended class with his mother,—reads and understands; Italian, reading knowledge, simple conversation; Portuguese, asked his mother to take this language at the Columbia summer school because he could not be registered himself; Hebrew, a beginner; Anglo-Saxon, a beginning. In astronomy he has worked out all the constellations from MacCready, and displays a very great interest in this subject. One evening this winter he noticed a new planet near the Twins. He said it was Saturn, but his mother thought it was Mars. E--- went home, worked the position out from the chart, and found it to be Saturn. He has a great interest in nature, wherever found, and is already able to use Apgar intelligently. His writing is not equal to his other accomplishments. He is very slow at it and for this reason dictates most of his "home work" to a stenographer. History is his chief and absorbing interest among school subjects.

At the age of nine E--- had completed the work of grade nine; at eleven years and ten months, graduated from high school; and at the age of thirteen had completed three semesters of work in Columbia College. He graduated with a Phi Beta Kappa key and other scholastic honors a few days before his fifteenth birthday. He matriculated for the Ph.D. degree before he was sixteen, and received this highest academic degree in his nineteenth year. Since then he has pursued a professional career with great distinction.

In sum, there is impressive evidence that general intelligence as measured by the Binet tests and similar tests corresponds fairly closely to the success of children in the conventional school program. In general it indicates the level,

difficulty, or complexity of mental functions that can be acquired, and the rate with which acquisition, within these limits, may go on. Nevertheless, wide variations in school achievement are found among pupils with the same I.Q., due to other factors which teachers should learn to take into account.

INTELLIGENCE AND PARTICULAR SCHOOL SUBJECTS

While the results of the Binet tests indicate very well the probable achievements in school work as a whole, they are not equally symptomatic of capacities in the particular subjects. The degree to which the tests indicate capacity in the several school functions is suggested by the coefficients of correlation between test scores and actual attainments. Taking as groups children in the same grades Burt ⁸ found the following:

<i>Correlation Between</i>	
Intelligence and composition . . . . .	.63
Intelligence and reading . . . . .	.56
Intelligence and arithmetic (problems) . . . . .	.55
Intelligence and spelling . . . . .	.52
Intelligence and writing . . . . .	.21
Intelligence and handwork . . . . .	.18
Intelligence and drawing . . . . .	.15

These correlations show that the Binet tests do not measure aptitude for all scholastic lines equally well. The tests correspond quite closely to the children's ability in the linguistic and abstract subjects—composition, reading, spelling, arithmetic. Children with high I.Q.'s are generally superior to those of lower I.Q.'s in these subjects, but they are not much better in writing, handwork, and drawing, that is, in mechanical and motor abilities. Although the correlations between the intelligence tests and the latter functions are positive, they are so low as to be practically negligible.

On the high school level correlations between intelligence and the various academic subjects follow the same pattern. Working with a group of tenth-grade children, Elden Bond ⁹ found the following correlations with the Stanford-Binet intelligence quotient:

Intelligence and reading vocabulary . . . . .	.79
Intelligence and reading comprehension . . . . .	.73
Intelligence and literary acquaintance . . . . .	.60
Intelligence and English usage . . . . .	.59
Intelligence and history . . . . .	.59
Intelligence and biology . . . . .	.54
Intelligence and geometry . . . . .	.48
Intelligence and spelling . . . . .	.46

INTELLIGENCE AND VOCATIONAL SUCCESS

Intelligence, as measured by the Binet tests, is fairly closely associated with general scholastic success, especially in subjects that demand linguistic ability and the acquisition and manipulation of abstract ideas. Whether the same relation holds between intelligence and success in vocations under the more complex situations of life is a matter worthy of investigation.

A careful study (by Vanuxem)¹⁰ of women sixteen or more years old in an institution for the feeble-minded shows clearly that in the lower levels there is a rather close relation between Stanford-Binet I.Q.'s and the complexity of vocational tasks which can be learned. (See Table XI.) In this study, attempts to teach women different tasks were made and the approximate minimum I.Q. required to learn to do each task satisfactorily was determined. The minimum I.Q.'s for each of various jobs and the average time required to teach the women are given in the accompanying table. A survey of this table shows that the more complex the job, the higher the I.Q. needed to learn it. For example, while women with I.Q.'s less than 25 can do certain simple tasks, they are unable to cook, make beds, or wait on table, which require shifting from one to another of several different—even if simple—activities.

During World War I results from the Army Alpha Intelligence Test were classified according to the occupations pursued by the men before entering the Army. This practice yielded interesting data on the relationship of intelligence and occupational status. During World War II, the Army General Classification Test was given to at least nine and a third million men, and the scores of representative occupational groups were worked out for a small proportion of the total group. Although

TABLE XI

THE MINIMUM INTELLIGENCE QUOTIENT OF WOMEN OVER 16 YEARS
OF AGE REQUIRED TO DO VARIOUS JOBS IN AN INSTITUTION FOR
THE FEEBLE-MINDED*

<i>Approximate Minimum I.Q.</i>	<i>Time or Number of Trials to Learn</i>	<i>Task or Vocation</i>
10-20	15 trials 1 day 3 days	Fetch and carry a single object, <i>e.g.</i> , chair Pick up stones, trash, etc., from lawn or walk Pull up <i>one kind</i> of weed from garden
20-25	6-8 days 3 days 5 days 8 days 5 days	Scrub floors or dust Pick <i>one kind</i> of fruit or vegetable Pick <i>two kinds</i> of fruit or vegetable Saw wood Sort and hang up clothes
26-30	7 days 11 days 18 trials	Do simple hand washing Do general cleaning Do dishwashing
31-37	6 days 18 days 17 days 52 trials	Pare and wash potatoes, etc. Milk cow Do hand ironing Make beds
38-44	34 days 29 trials 25 trials	Do simple cooking Do simple hand sewing and mending Wait on table
45-55	19 days 113 days 65 days 89 days	Help around farm Do simple dressmaking Paint barns, etc. Do simple carpentry
60-70	19 days 25 days	Plow Do general farmwork
77	11 days	Do general housework

* From M. Vanuxem, *Education of Feebleminded Women*.¹⁰

data have been published for only 81,553 white enlisted men, these figures indicate, at least roughly, the relative positions of many occupational groups. The following table gives the data for a few occupations. In interpreting the following list, it should be realized that the groups overlap greatly even when there is a difference of ten or even twenty points in their median scores.¹¹

TABLE XII

THE AVERAGE (MEDIAN) ARMY GENERAL CLASSIFICATION TEST SCORE FOR CERTAIN OCCUPATIONAL GROUPS. BASED ON A TOTAL OF 83,618 CASES. THE SCORES ARE NOT I.Q.'s BUT ARMY GENERAL CLASSIFICATION TEST STANDARD SCORES*

<i>Score</i>	<i>Occupation</i>
124 129	Students in mechanical, electrical, civil, and chemical engineering; physician, business man, accountant; chemist; writer; teacher, lawyer, auditor.
120 123	General bookkeeper; stenographer, pharmacist; chemical laboratory assistant; draftsman; reporter
115 119	Clerk, meat or dairy inspector, cashier, physics laboratory assistant, production manager, linotype operator, athletic instructor; store manager; telephone repairman
110 114	Embalmer; airplane mechanic; artist, band leader; photographer; academic high school student, toolmaker, practical nurse; printer; machine shop foreman; lathe operator
105 109	Policeman; sales clerk; electrician; watch repairman; machinist's helper, labor foreman; vocational high school student; cabinet maker, steam-fitter.
100 104	Welder, plumber, railroad switchman, automobile repairman; bricklayer, carpenter, pipe fitter, chauffeur
95 99	Painter, truck driver, baker, tailor, cook, longshoreman.
90 94	Laborer, barber, shoe repairman
85 89	Teamster; miner, farm worker, lumberjack.

* From N. Stewart, "A.G.C.T. Scores of Army Personnel Grouped by Occupation" ¹¹

When comparisons of radically different vocations are made, there is perceptible a tendency for vocations that require facility in dealing with words and symbols to stand higher than those that require aptitude for manipulating things and mechanisms. The clerical workers in general excel those engaged in mechanical occupations. The tests appear to favor those skilled in handling words and symbolic concepts as contrasted with those proficient in motor and mechanical abilities. In general, moreover, the higher the educational status the higher the score.

Further examination of the data, however, will disclose the fact that the test measures abilities which possess a wider significance. Making comparison within a similar type of occupation, the more skilled workers appear to stand higher on the

test than the less expert. The chemists are above A.G.C.T.-score 124, the chemistry laboratory assistants average about 120. The students in engineering are in the top sections of the list, whereas electricians and foremen and mechanics are below 115; the general electrician, machinist's helper, etc., are below 110, and workers on more specific tasks, such as carpenter, plumber, welder, pipefitter, are below 100; while the unskilled laborers are at the bottom of the list. Among the several types of clerical workers a similar correlation between intelligence and occupational levels exists. Note also that the accountants and auditors surpass the bookkeepers, and that the stenographers are superior to the typists and file clerks. Thus, within similar occupational lines, intelligence as measured by this test is associated with levels of proficiency. This result is probably due in part to the fact that the better the position the greater the need for ability to deal with abstract facts and in part to the fact that the higher the positions the more the education required of those placed in them.

It is significant that the members of the professional classes nearly always rank high in intelligence tests. For example, the median Army Alpha scores of 5,950 students in Ohio State University in the Liberal Arts College and in the various professional schools (law, medicine, etc.) were all well above all the army occupational groups except the professional classes. The median for the medical and law students, for example, was 142.¹²

INTELLIGENCE AND SOCIAL ADAPTABILITY AND LEADERSHIP

The use of the tests in the Army during World War I provided material that suggests a fair correspondence between fitness for managing and leading men and intelligence ratings. The students of the Officers' Training Schools who succeeded in earning commissions were on the average of higher intelligence, according to the tests, than those who failed. Among non-commissioned recruits in the cantonments, fitness for advancement as judged by officers corresponded fairly closely with

intelligence scores. Finally, the average intelligence of seasoned groups corresponded fairly closely with military rank. In one group, which included approximately 30,000 men, the privates obtained an average Alpha score of approximately 73, corporals 95, sergeants 107, and commissioned officers 139. (These are raw scores, not I.Q.'s, and are different from the A.G.C.T. scores listed above.) The overlapping of the intelligence scores of one rank upon others was great, however,¹³ and education as well as intellectual endowment doubtless played a role. Similar data from World War II are not yet available.

Many studies have been made to ascertain the correspondence of intelligence and social adaptability, leadership, popularity, etc., in children. These results show a similar, but less clear-cut, relationship to those obtained on adults in the Army. All lead to the conclusion that intelligence indicates in some degree, but far from perfectly—indeed, sometimes it appears only slightly—the capacities required in understanding, getting on with, and managing other human beings. There is some evidence, however, that the typical social leader is a person brighter than the average of this group, but not the very brightest.¹⁴ If you glance at the surface of distribution (Fig. 6) you will see that the majority of children lie near the average. A person of 110 to 130 I.Q. is not so far above the average as to have vastly different interests and ability from the average; a person of 180 I.Q. is very distant from average and duller people—so distant as often to have decidedly different abilities and interests. A person, especially a young one, so far out of touch with the general population of his age is more likely, other traits being equal, to be not so well understood and not so highly favored. The favorite is often a person of less intellectual endowment who is "more like the bunch." This does not mean that extremely bright children are conceited. They are more likely to be merely puzzled as to why they differ as they do from the majority. Sometimes they unhappily think they must be a little queer or a little "off." Such feelings of isolation or inferiority seldom improve the bright child's adjustment in his social group.

INTELLIGENCE AND MORAL ADJUSTMENTS

Fine gradations of moral adjustments are difficult to obtain. We may seek for some evidence in the studies of the relation of intelligence to delinquency and crime. Of the many individual studies, one made by Burt¹⁵ will be considered—first, because it is based upon children, who can be more adequately measured than adults; second, because it is probably fairly typical; and third, because of the care with which both intelligence and other abilities were measured. The group comprised 107 juvenile delinquents, ages six to fifteen, whose misdemeanors included theft, begging, truancy, assault, sexual offenses, damage to property, and general incorrigibility. The average chronological age of the entire group was 13.2 years, the average mental age 11.3, thus giving an average retardation of two years in mental age or an average I.Q. of 85.6. Analyzing the distribution further, it was found that 7 per cent might be classified as “feeble-minded”; 20 per cent as very dull; 44 per cent as less dull but below average; 27 per cent as about average; and only 2 per cent as above average. Other studies of delinquents, however, have shown somewhat larger proportions of “above average” intelligence. Superior intelligence among children is not incompatible with delinquency; indeed, as will be pointed out later, pupils with very high I.Q.’s (above 150) have special difficulties in making adequate social adjustments. Delinquency among them, however, is relatively rare. The proportion of feeble-mindedness in the delinquent group is, on the other hand, much greater than the proportion of feeble-mindedness in the total population. The most significant fact probably is that although the delinquent group, as a whole, is a somewhat dull group, delinquency occurs among children and adults of all intellectual levels.

In Burt’s study, the educational attainments of the delinquent children were appraised by objective tests with most significant results. The retardation in school attainments was twice as great as the retardation in mentality; namely, the equivalent of nearly four years. A similar finding was secured

in America by Bond and Fendrick.¹⁶ Burt found that the educational achievements of a group of delinquent children with an average age of 13.2 years was equal to the normal attainments of average children of 9.5 years. Not a child was above the average of his chronological age in school attainments; only 5 per cent were approximately equal to it; one-fifth were slightly below; and three-quarters were retarded by 30 per cent or more. This suggests that marked difficulties and frustration in school work tend to be associated with delinquency. It is now rather widely agreed that failure to make a satisfactory adjustment in school or elsewhere may (in some instances) result in delinquency or other forms of maladjustment.

Since dull children have less aptitude for school work than bright children, they tend to experience less satisfaction and more frustration in school and therefore are more likely to rebel and to try to find a compensating satisfaction in activities that are classed as delinquent. The very bright children are sometimes frustrated by being forced to spend their time in activities that are far below their level of ability and interest. Thus, frustration from any source may result in maladjustment and misconduct, as will be pointed out in later chapters in which other factors will be considered.

CONCLUSIONS

The intelligence tests do not measure equally well all types of capacity to learn, but those which they do reveal most reliably are of great importance. Such capacities are important determinants of achievement in school and college, and success in many vocations. Social adaptability, proficiency in managing people, and effectiveness of social adjustments are also associated to a small degree with this type of intelligence. The association of intelligence and ability to acquire various mechanical and motor skills—writing, drawing, painting, athletics, and various mechanical trades—is positive but very low.

The fact that the I.Q. is not, in an individual case, absolutely constant from year to year, that it is not possible to give a test once and "fix" the level of intelligence for life, and the

further fact that intelligence does not enter equally into all kinds of activities and vocations, must be taken into account in practical uses of intelligence tests in schools and elsewhere. The latter fact indicates, moreover, that abilities not fully measured by an intelligence test play an important role in school and society. Before giving more definite recommendations for the use of intelligence tests, we must canvass the facts concerning other abilities and disabilities.

SPECIAL ABILITIES AND DISABILITIES

The fact that the correlations of intelligence tests with motor and mechanical abilities, artistic and musical talents, and other aptitudes are not high and that such abilities depend to a great extent upon other capacities has led to many investigations designed to develop tests of various special aptitudes and inaptitudes. Some of these will be briefly characterized.

Progress has been made in developing aptitude tests for achievement in the fields of music, mechanical arts and trades, fine arts, physical arts such as athletic sports, manual dexterity, clerical work, teaching, nursing, medicine, and law. During World War II, extensive advances were made in developing tests for aptitudes for many specialized types of activities in the Army, Navy, and especially in the Air Corps. Aside from the work on special abilities in the armed services, the most extensive work has been done in developing tests for aptitude in music and the mechanical fields. A brief description of a few tests in these and other areas will give an idea of the nature of such aptitude tests.

Tests of Musical Aptitude or Talent. During his long professional career, C. E. Seashore, aided by his students, conducted extensive research to determine the basic abilities and capacities involved in the creation (especially singing and playing instruments) and the critical appreciation of music. This work was paralleled by the construction and tryout of tests for "musical talent," as Seashore called it. The tests have been revised from time to time as further information came to light. The current series of tests consists of two series of three double-

faced phonograph records by means of which one may give tests for the sense of pitch, the sense of intensity, the sense of time, the sense of rhythm, the sense of timbre and tonal memory. One series of tests is provided for children and adults in general and another series for prospective or actual students of music or for trained musicians.¹⁷

Since all these abilities are involved in music, it follows that aptitude for music is not to be conceived as a single and simple capacity. On the contrary, it is an organization of many. Excellence in one, coupled with deficiencies in others, would not suffice for achievement. Some single deficiencies such as the capacity to discriminate pitch within certain limits—a capacity that is relatively difficult to improve—would, on the other hand, make progress in certain phases of musical ability impossible, however optimum the capacities in other respects. The apt individual is the one who approaches an optimum degree of ability in all. A final appraisalment of musical aptitude would consequently be based on a consideration of many component abilities, each weighted in accordance with its importance in relation to others. The purpose of the Seashore Musical Talents Tests is to determine the degree of achievement which education and training are likely to produce. These tests, in other words, provide a prediction or prognosis of success and should be useful for educational guidance. The Seashore Tests, however, are more valid in revealing marked deficiencies than in discriminating among above-average levels of talent.

Tests for Mechanical Aptitude. Several tests have been developed for measuring aptitude for constructive and manipulative activities in dealing with tools, apparatus, machines, and materials in the numberless mechanical arts, crafts, and industries. Among the better known tests are the MacQuarrie Test of Mechanical Ability, the Bennett Test of Mechanical Comprehension, the Detroit Mechanical Aptitude Examination, the O'Rourke Mechanical Aptitude Test, and the Minnesota Mechanical Ability Tests. The Minnesota Tests¹⁸ consist of:

1. Paper form-board tests, which measure ability to discriminate various designs and figures.
2. Spatial relations tests, which measure ability to perceive spatial relations.
3. Assembly test, which measures ability to solve mechanical problems.
4. Interest analysis test.
5. Packing blocks test.
6. Card-sorting test.

The last two tests measure motor skill and dexterity.

The tests of mechanical aptitude, like other aptitude tests, give at least rough indications of the degree of talent an individual has. They are, like other aptitude tests, to be considered not as a final or sole criterion of promise even in the mechanical arts. The modern practice is to consider the results of such tests along with other data about the individual, such as his intelligence and other test scores and evidence concerning his personal, social, and other traits, and especially a history of the activities and hobbies pursued throughout his life.

Tests for Artistic Aptitude. For talent for discriminative activities in painting, drawing, modeling, architecture, dress-making, interior and exterior decorating, etc., several tests have been devised. Of these probably the best known are the McAdory Art Test, the Lewerenz Tests of Fundamental Abilities of Visual Art, and the Meier-Seashore Art Judgment Test. The latter test consists of 125 pairs of samples of art work, one member of each pair selected from the work of a master. Artistic insight is shown by the success of the subject in selecting the best sample in each group. This test, and the McAdory also, measures ability to distinguish merit in art products, an important, perhaps indispensable, ability, but certainly not the only one needed in artistic achievement. Tests of other aspects of artistic talent are being developed, but as yet a satisfactory program of measuring artistic capacity in general has not been developed.

Tests for Physical Capacities. Various tests for physical capacities, which perhaps function in purest form in athletics,

gymnastics, and sports, but which enter into other skills that require skillful management of bodily action, have been developed. The Rogers Physical Capacity Tests and the Brace Motor Ability Tests are examples of tests of locomotor capacities. The Rogers test ¹⁹ gives a strength index based on such measures as lung capacity, strength of grip, strength of back, and an athletic index based on the 100-yard dash, the broad jump, the high jump, the shot put, and skill in baseball, football, and basketball throws. The Brace Test consists of various tests of body balance. Such batteries have proved useful in gauging general all-around athletic competence and in classifying students into groups of similar aptitudes for competitive games and sports.

Tests for Social Capacities. For measuring social capacities essential to understanding and influencing other people, as in the work of the teacher, minister, salesman, military officer, physician, politician, lawyer, industrial manager, and so on, many tests have been experimented with but none is as yet very comprehensive or outstanding.

Other Aptitude Tests. At the present time there is much activity in developing aptitude tests in various areas. Progress has been made in constructing tests of aptitude for certain professional fields. The following titles suggest some of the important achievements:

Minnesota Clerical Test (Andrew)

Aptitude Test for Nursing (Moss and Hunt)

Scholastic Aptitude Test for Medical Students (Moss)

Law Aptitude Examination (Ferson and Stoddard)

Prognosis Test of Teaching Ability (Coxe and Orleans)

Stanford Scientific Aptitude Test (Zuve)

George Washington Test of Ability To Sell (Moss, Wylie, Loman, and Middleton)

Turse Shorthand Aptitude Test (Turse)

Most of these tests are designed to measure the information which seems to be necessary background for achievement in the field, together with the student's aptitude in those skills which are deemed particularly important.

The Coxe-Orleans Prognosis Test of Teaching Ability,²⁰ for example, is designed to assist in the prediction of a student's probable success in teaching. The test is composed of five subtests giving scores on general information, knowledge of teaching methods and practices, the ability to learn the type of material included in professional books used in teacher training courses, the ability to understand educational reading matter, and the ability to study and work out educational problems.

Although the correlations between the test, which measures a number of seemingly important skills, and a comprehensive achievement test in normal school work given at the end of the first year range from .534 to .839, the authors advise adding to it the scores from a group intelligence test, and, if possible, scores from standardized achievement tests in high school English and perhaps in several other high school subjects. The authors claim that it is possible to secure a multiple correlation as high as .90 when such a combination is used. This combination appears to be fairly reliable for the prediction of individual success in normal school.

PROGNOSIS TESTS

Vocational Interest Inventories. Many tests are now available which aim to measure the extent to which one's vocational interests conform to those of successful individuals in various fields of work. These inventories suggest interest trends but do not measure general or special abilities. Tests such as those listed below are valuable in the measurement of vocational interests. The first test, by Strong, represents the results of very extensive research.

- Strong Vocational Interest Blank
- Cleeton Vocational Interest Inventory
- Lee and Thorpe Occupational Interest Inventory
- Brainard Specific Inventories
- Kuder Preference Record
- Dodge Occupational Personality Inventory
- Waller and Pressey Occupational Orientation Inquiry

The Orleans Algebra Prognosis Test,²¹ which is one of the best known of the prognosis tests, is made up of twelve subtests. The first is a test of arithmetic fundamentals. The next ten teach short lessons covering the topics usually taught in beginning algebra, such as meaning of exponents, and addition of like terms. Each lesson is followed by a brief test in which the pupil must apply what he has learned. The twelfth test is a summary test covering all the test lessons. Correlations from .50 to .80 were found when this test was correlated with the Columbia Research Bureau Algebra Test I.

The value of a prognosis test lies partly in its ability to predict success in a school subject more reliably than an intelligence test, or to give a much higher prediction if combined with an intelligence test. In a recent study²² the multiple correlation of the Algebra Prognosis Test with the mid-term and final examinations in algebra was found to be .57. The Terman Group Intelligence Test correlated .52 with the same measures. When the two tests were used together the correlation with the mid-term and final examinations combined was .64. When a test of reading explanatory passages in algebra was combined with the Algebra Prognosis Test the correlation with the mid-term and the final examination as a combined measure of ability in algebra was raised to .69. In other words, the prognosis test, especially when combined with other measures of ability, is valuable in supplying for the teacher a more accurate estimate of the level at which the students may be expected to work than will an intelligence test alone.

Readiness Tests. A recent development in testing of the prognosis type is the readiness test which is designed to give a measure of the child's preparation for learning a subject with success. These tests are usually thought of as belonging to the first grade, but the concept can be extended to mean readiness to learn at any new level. The most extensive work has been done on tests of "Reading Readiness." In a general way, the reading readiness test is similar to other "aptitude," "talent," or "prognosis" tests, but in certain respects it perhaps illustrates the most recent point of view in testing.

Reading readiness testing has grown out of extensive investigations of the factors involved in learning to read. Its purpose is to include as many of these factors as in an objective, standardized battery of tests. Like other prognosis tests, it is designed furthermore to have diagnostic value, that is, value in revealing to the teacher each pupil's strength or weakness in each factor so that her teaching may take them into account. Indeed, the diagnostic and predictive clues may be used to determine not only how "ready" the pupil is to begin to learn to read but also to reveal the important steps to take for all pupils from the most "ready" to those as yet quite insufficiently "ready" to start lessons in actual reading.

The Gates Reading Readiness Tests,²³ which are given to children shortly after they enter the first grade, will serve as an example. It consists of five tests as follows:

1. Picture-Directions Test. This test consists of giving the pupils orally a series of directions to carry out by marking objects in a picture. It measures ability to interpret pictures and to attend to and follow directions, and to recognize in pictures objects common in the child's experience.
2. Word Matching Test. This test measures familiarity with printed word forms at a rudimentary level.
3. Word Card Perception Test. This test measures ability to recognize in small type on a page words exposed for five seconds in large type on a card.
4. Rhyming Test. This test measures the child's ability to distinguish the component sounds in words—an ability involved in learning "phonics."
5. Letter and Number Reading Test. This is a measure of ability to read the letters of the alphabet and the numbers below 10.

A score is obtained for each test as well as a total score for the test as a whole. The correlations of the total score obtained at the beginning of the year with reading ability measured at midyear are about .71. The correlation of the Pintner Cunningham Mental Age from a test given at the beginning of the year and reading ability at midyear is about .44. The reading readiness test gives a clearly better prediction of success in

learning to read during the term. The readiness test is more useful, furthermore, since the scores of the several tests tell the teacher in what abilities, necessary for learning to read, the pupil is strong, average, or weak. If his score is relatively low in Picture-Directions, special attention should be given to developing ability to interpret pictures and to listen to and carry out instructions. In this way the weak spots in the pupil's equipment may be strengthened sufficiently to ensure success in learning to read. The intelligence test, as observed earlier, however, is correlated with ability to learn to read and it has a value for predicting other forms of first-grade achievement. When it is given, the M.A. may be combined with the reading readiness total score. The correlation then becomes about .76, which is higher than that given by the reading readiness test alone. The M.A. and I.Q., moreover, have certain values for understanding the pupils which the readiness tests do not have.

The studies for predicting reading by means of readiness tests and intelligence tests singly and combined reveal important facts about the use of both types of test. The intelligence test predicts school progress in general fairly well, but achievement in particular subjects like reading less accurately than is desirable. It gives a good indication of general capacity but not specific information about particular strengths and weaknesses of great importance in teaching a particular subject. The more analytic tests, like the reading readiness tests, tests for musical talent, or tests of prognosis of algebra, give the teacher a better idea of what can and should be done and what cannot be done by teaching.

The full sizing-up of the children's readiness for reading is not limited to a readiness test such as the one mentioned above and the intelligence test. Although these two tests taken together give a very high correlation with reading progress, other influences enter in to make the prediction less than perfect. Among them are physical factors such as health and vigor, sensory factors such as acuity of vision and hearing, social factors such as feelings of security and satisfaction in the new classroom situation, emotional factors such as nervous tension when

studying or fear of making mistakes, and many others such as speech habits, interest in stories, and the effects of the attitudes of parents toward reading. The teacher can use many forms of information beyond the very valuable insight given by the intelligence and aptitude, prognosis, or readiness tests. Indeed, the purpose should be to achieve as full an understanding as possible of the very complex make-up of each child. The tests discussed in this chapter are not substitutes for such insight but means of achieving it in part.

USES OF INTELLIGENCE TESTS AND APTITUDE TESTS

The discussions in the preceding sections have made it clear that intelligence tests do not measure all a person's ability. They do, however, give an estimate of one very important aspect of it which is definitely related to academic success and in less degree to achievement in most other fields. For this reason intelligence tests have become valuable instruments in education. The uses of intelligence tests will vary from situation to situation, and it is therefore inadvisable to attempt to present them in this book. Certain general purposes underlying the use of intelligence tests are common, however, to almost all school situations and will be considered at this time. In discussing the practical uses of intelligence and aptitude tests it will be advisable to review certain facts previously presented in this and the preceding chapter—which will probably do no harm!

Use of the Intelligence Test for Determining the Optimum Level of Work. A primary aim of education is to assist each child to make the best possible use of all his capacities. Although a readiness test or a prognosis test may give a better prediction of success in one particular area, such as reading or algebra, the number of such tests is limited and their value is confined to the specific subjects which they are designed to test. The intelligence test is the best *general* measure of a pupil's capacity to succeed in his school work. The mental age gives the teacher an estimate of the mental level at which a child can be expected to work most efficiently in academic subjects except

those like music, art, and manual activities which seem to depend upon highly specific aptitudes. The value of the intelligence test score for determining the optimum level of study depends upon the recency, validity, and reliability of the test, since as has already been shown the I.Q. tends to vary in many cases from time to time and from test to test. If the I.Q. does vary significantly on a retest this fact in itself is of importance to the teacher. A sharp rise in I.Q. may be the result of better adjustment to school, of freedom from emotional tension, of a change from one intelligence test to another, or of numerous other changes. A sharp drop in I.Q. may be the result of illness, or of recently developed emotional tensions, of the use of different tests or examiners, or of other causes, some of which may be discovered and corrected or allowed for.

Use of the Intelligence Test in Diagnosing Disabilities in School Subjects. In the past the tendency has been to consider academic ability and intellectual ability so closely related that the ratio of the first to the second could be used as an "accomplishment quotient" * similar to the intelligence quotient. Recent studies have shown that the relationship is not exact enough to justify strict use of the accomplishment quotient technique. The present tendency is to compare the score representing achievement in a school subject and the mental age in a more informal and flexible way. The degree of deviation between the two scores necessary before it is considered serious enough to warrant remedial help will vary from subject to subject and from grade to grade. For example, in the primary grades a "reading age" which is over six months below the mental age may be a serious retardation in certain classes, whereas in grades four and five the retardation can be as great as a year before it becomes a handicap, and above grade six a

* This may be computed by dividing the "educational" or achievement age by the mental age. Thus if scores on tests of school subjects are converted into age scores, the average of the latter may be computed to give an average educational or achievement age. If the educational age is 12 years and the mental age 10, dividing the former by the latter gives an accomplishment quotient of 120; if both are 10 years, the accomplishment quotient is 100; if the educational age is only 8 years, and the mental age 10, the accomplishment quotient will be 80.

retardation of as much as a year and a half or two years may not be very serious.

Use of the Intelligence Test in Grouping Pupils for School Work. The M.A. gives an indication of the mental level at which a student may be expected to comprehend his work and learn efficiently in general. The same M.A., however, may be shown by pupils quite different in chronological age. For example, the M.A. of 12 years may be secured by a child who is chronologically 12 years of age, or by one who is 16, or by one who is 8. The first child has an I.Q. of 100 and may be expected to learn with average quickness, the second has an I.Q. of 75 and will probably grasp what is taught much more slowly, and the third, whose I.Q. is 150, will probably comprehend and learn much faster than either of the others. It can be seen, consequently, that the I.Q. is a rough index of the probable learning rates of the various members of the class. With this information at hand the teacher can adjust her methods to meet the needs of individual pupils.

Many schools have used the chronological age and the I.Q. as a basis for selecting classes within a grade. A practical disadvantage of homogeneous or ability grouping, as this system is called, can readily be understood when one realizes that most of the correlation coefficients of intelligence tests with single academic subjects range from .40 to .60. This means that estimates of ability in any particular school subject based on intelligence alone will be far from perfect in a large proportion of the children. Since the correlation of the typical academic subject with any other subject is no higher than the correlation of the typical subject with intelligence, the child who is above average in arithmetic will not necessarily be above average in reading, history, or in any other school subject. The result is that classes grouped carefully according to intelligence show great overlapping of ability in the various school subjects. "Ability groups" formed on the basis of intelligence tests moreover, will be even more heterogeneous in physical, mechanical, musical, and social interests and abilities, as indicated by the

fact that the correlations of intelligence with abilities in these areas are very low.

In many schools homogeneous grouping is giving way to more careful and extensive study of individual children and less formal grouping within the classroom for different purposes. The teacher uses the intelligence test together with all the other information available about the child to place him with others of his ability in smaller groups, the composition of which will vary from subject to subject and from time to time.

Identification of Intellectual Deviates. In any classroom the child who is very bright and the one who is very dull are likely to be particularly difficult problems. The teacher's task is difficult enough when the pupils in her class vary but slightly from average competence. In the early sections of this chapter the great difference between children with I.Q.'s below 80 and those above 120 was illustrated. Often children at these extremes learn to compensate for, or to disguise, their ability or lack of it in such a way that the teacher is not aware of the intellectual level with which she has to deal. This may result in attempts to force a dull child to do work that is well beyond his intellectual ability, and in failure to assist the gifted child to make use of his exceptionally great capacity.

There is as yet no agreement on the value of segregating the children at each end of the intellectual scale into "special" or "opportunity" classes in order that they may work with others of similar high or low ability. Whatever the final decision on this question may be, it is fairly certain that these extreme cases should be discovered, and the teacher given as much assistance as possible in working with them. Especially is this true of the gifted child. The very dull child is likely to be recognized, since sooner or later he will reach a place in his work where he will experience great difficulty. The very gifted child may slip through elementary school, high school, and even college without ever having been recognized as exceptional and without ever having been taught how to make full use of his rare power. One of the most important problems facing educators today is that of identifying and cultivating the potential ca-

capacity for leadership which most children of high I.Q.'s really have.

Use of Intelligence Tests in Vocational and Educational Guidance. The fact that intelligence is positively related to vocational competence and to attainments in college work has definite practical implications. The educational or vocational counselor can use the score on the intelligence test along with other data to predict a pupil's success in college or in many vocations. For predicting either scholastic success in future school work or vocational success thereafter, many factors as well as intelligence must be taken into account. Vocational success depends not only on intelligence but also upon health, physical strength, ability to work with people, interest, personality characteristics, and specific aptitudes, such as those discussed earlier in this chapter. Success in college depends in part upon such factors as persistent effort, choice of appropriate courses, ability to adjust to college life, and to some extent on the intellectual level of the other students who are attracted to that particular institution.

Use of the Intelligence Test to Estimate the Range of Abilities in a Class. The preceding discussion has been concerned with the adjustment of the individual pupil. The intelligence test can be used to secure useful information about whole classes, grades, and schools. If intelligence test scores are available for all the children in a class, the teacher can note the range of ability with which she must deal. In some classes this may be small, and the group may contain no very bright or very dull pupils; in others the range may be very wide, and the group may contain both very gifted and very dull children. A teacher who has the latter group must make allowance not only for differences in information in the various subjects but also for great differences in learning rates. The accompanying table, showing the distribution of mental ages for grades three to eight, for example, displays this fact. Grade six, for example, has two children with an M.A. of 10 years, it has two M.A.'s as high as fourteen, or higher than a number of children in grade eight. Thus although the average mental age increases from

grade to grade, each grade really contains the mental ages of several grades. This gives the teacher a difficult task in adjusting assignments, methods of instruction, levels of performance (to mention only a few of the problems) to meet the needs of all pupils. Since it is frequently found that a teacher often cannot correctly determine the intellectual range within her class on the basis of school attainments alone, the intelligence test is an indispensable means of securing valid information concerning the intellectual constitution of her group and of discovering the needs of individual pupils.

TABLE XIII
DISTRIBUTION OF MENTAL AGES OF 220 CHILDREN BY GRADES*

<i>Mental Age</i>	<i>Grade</i>					
	3	4	5	6	7	8
16						2
15					4	12
14				2	13	17
13				10	12	5
12			5	21	5	
11		9	22	10	2	
10	8	23	11	2		
9	37	15	1			
8	19	1				
7	2					
Average	8.8	9.8	10.8	12.0	13.3	14.3

* From L. M. King, *Learning and Applying Spelling Rules in Grades Three to Eight*.²⁴

Use of Intelligence Tests in Determining the Level of Ability in a Class or School. Even in cities in which homogeneous or "ability" grouping is employed, classes of the same grade may differ greatly. If teaching is approximately the same, the average achievement of a class will tend to vary with its average intellectual ability. The use of the average mental age of the class as an approximate standard against which the achievement of the group may be compared is fairly reliable. If the abilities of different teachers are to be appraised in terms of

the average attainments of their respective classes, the average mental ages and intelligence quotients of the several classes should be determined. It would be obviously unfair to expect a teacher with the class of lowest average intelligence to produce as high abilities among her pupils as the teacher whose class has the highest average intelligence.

Average intellectual ability may also vary from school to school. Schools situated in districts of low socioeconomic status are likely to have a school population of less than average mental ability. Those drawing children mainly from professional or well-to-do-groups will, as a rule, have better than average mental ability. Comparisons of different schools will be fairer and more meaningful if they take into account the intellectual capacity of the children in them.

Measurement of Special Abilities. The intelligence test, we observed, does not give a satisfactory prediction of ability to achieve in music, art, and various mechanical and social lines. Hence, there has been much activity in developing aptitude tests for these important types of achievement. Up to the present time, however, the development of these tests has not reached a point where the very gifted in these special abilities can be distinguished with a high degree of certainty from the moderately gifted. Available tests do, however, serve as a rough screen to identify those who have very small amounts of each ability and those who show at least average promise. Experimentation with such tests has laid a foundation on which improved instruments may be developed in the near future, but for a time guidance and prediction must be conducted with caution.

Prediction of Success in Particular Academic Subjects. Readiness and prognosis tests have been designed to give a higher prediction of success in specific subjects than does the intelligence test. Some of them are distinctly valuable for giving teachers an estimate of the ease with which pupils may learn a subject and the levels of achievement that they may be expected to reach. Since many of the readiness and prognosis tests give higher correlations with particular subjects than does

the intelligence test, they provide useful bases for the selection of courses, especially at the high school level. Skillful combination of prognosis, intelligence, and achievement tests, to be discussed more fully in the next chapter, will make counseling still more accurate and effective.

Diagnosis of Subject Matter Difficulties. At the elementary school level, where a child has little choice of subjects, the readiness test is valuable as a diagnostic instrument. Not only is it useful for predicting the child's future success in a special subject, but also it gives the teacher information about the areas in which the child needs more training before he faces the new subject. The readiness test is useful also in placing the pupil at the optimum level of work and in selecting textbooks and other materials of proper difficulty.

A Basis for Class Groups. An alternative to homogeneous grouping on the basis of the intelligence test is the formation of groups of students of approximately the same level of ability in one particular subject on the basis of scores from readiness or prognosis tests. For example, a teacher may form three or more groups within her class on the basis of scores obtained from a reading readiness test at the beginning of the year. Those obtaining the highest scores are grouped together for more advanced and rapid work. A second group, consisting of those obtaining the next highest scores, may be formed for more elementary and extensive help; a third group may need considerably more assistance in various lines at a still more easygoing pace; and a low group may be provided with a rich program of "reading readiness" activities for several weeks or months before undertaking full-fledged book reading. Pupils who progress appreciably more rapidly or slowly than was indicated by the tests may be shifted to a higher or lower group. When such a method of subgrouping is used, the class is rearranged for each subject. Thus pupil *A* may be in the top group for reading, the second group for writing, the third for language activities, and the lowest for art work. The number of subgroups may also vary from subject to subject. For example, there may be five for reading, three for writing, two for fine

arts, and only one for discussions of current topics. The number of groupings may also vary from time to time for one subject or be different for different phases of the subject. Thus there may be five groups for the word enrichment and word analysis activities in reading, two for silent reading of supplementary books, and only one for reports on outside reading.

Combination of All Information for Educational Guidance. The major recommendation suggested by the facts reviewed in this chapter is that the teacher and counselor should secure and use as much information as possible about each individual. The prognosis test will be more valuable than the intelligence test for predicting success in particular subjects, and the two combined will be even more effective than either alone. The use of an achievement test with them will increase the reliability of the prediction still further. Measurement of progress and diagnosis of difficulties from time to time during the course are indispensable in achieving fuller understanding of the pupils' needs. Many other factors such as health, the efficiency of the sensory equipment, interest, persistence, availability of equipment with which to work, emotional adjustment to school and to the home, and various personality traits also influence achievement. Only when the teacher has as much of this information as possible will she be able to give the maximum assistance to each child. In Chapter XXI, attention will be directed to such factors as these.

SUMMARY

Tests of general intelligence and special aptitudes are being put to increasingly diverse and fruitful uses as a result of continuous research. Some of the most important facts about the nature and use of these tests are summarized below.

Within any age group variations in intelligence are very wide and the distribution of I.Q.'s for our school population is fairly accurately known.

There is a fairly substantial positive correlation between the intelligence test score and scholastic achievement in general. The correlation is much higher with some subjects than

with others, hence the need for tests of special aptitudes, especially in the case of such abilities as music, art, handicrafts, mechanical arts, and various trade and occupational skills. The results of use of tests in the armed forces and in schools indicated that the general intelligence tests emphasize ability to deal with verbal and abstract or symbolic materials rather than aptitudes for handling things and mechanisms. Social adaptability and skill in managing people are positively but not very highly associated with intelligence test scores.

Common practice today in schools, industry, and the armed forces is to supplement the general intelligence test with tests of special ability, skill, or aptitude. Tests of aptitude for music, certain mechanical arts, many trade or professional skills, such as clerical work, piloting airplanes, nursing, and teaching, are now in use.

Tests of vocational interests, often called "interest inventories," and of readiness to learn a particular skill or acquire a complex ability, as in the case of the "reading readiness" tests, are being used increasingly to improve guidance and teaching.

Intelligence and aptitude tests and closely related tests such as prognostic and readiness tests are now employed, usually together and in combination with other appraisals and measures for such practical purposes as

- a. determining the optimum level or difficulty of work for any individual pupil;
- b. classifying pupils into more congenial groups for work in regular classes and selecting the more marked deviates for special classes, such as classes for mentally retarded pupils;
- c. diagnosis of special disabilities and difficulties, such as the "reading disability";
- d. detecting the gifted, such as the pupil with an I.Q. in the "very superior" group, or the pupil with exceptional mechanical insight;
- e. estimating the range and level of scholastic aptitude in a given class or school;
- f. providing educational and vocational guidance and predicting future scholastic and vocational possibilities.

QUESTIONS AND EXERCISES

Draw a curve of distribution which we would get if we assumed that individuals are divided sharply into two types, the bright and dull. How does this curve differ from the curve of distribution found for I.Q.'s on the Revised Stanford-Binet test?

Criticize or defend each of the following practices:

- a. Insisting on a long march that all keep step.
- b. Organizing companies in the army to get together those of as nearly equal height as possible instead of having a range of heights in each company.
- c. Assigning all students the same length of time to master an assignment.
- d. Dividing large college classes into several sections according to their general scholastic ability in the subject in question.
- e. Having the brighter students in this course do fewer exercises than the duller.
- f. Having a fixed rule in college that all full-time students must take sixteen points, no more, no less.
- g. Having a rule that anyone who passes all examinations gets credit for the course without regard to attendance.

It has been proposed, inasmuch as individual differences in achievement in college courses are so great, that a scheme of "credit for quality" be adopted. For example, for a grade of A the credit should be 4; for B, 3; for C, 2; for D, 1, and for F, 0. Defend or oppose this proposal.

In what ways should the methods of teaching bright children differ from those used with dull children? What subjects will the bright probably find most interesting? Which will the dull like best?

Comment on this statement, "It may be of greater value to society to discover a single gifted child and aid in his proper development than to train a thousand dullards to the limit of their educability."

How would you explain the fact that children of superior intelligence when graded with those of the same age occasionally become mischievous, lazy, or bored with school work? Does the occasional report of an eminent man getting along badly in school, if true, necessarily prove that such men were stupid when young or that they were unable to do school work?

CHAPTER IX



THE GENERAL NATURE OF LEARNING—I

Fundamentally, teaching is stimulating and guiding learning. Such procedures as making assignments, asking questions, using verbal illustrations, manipulating visual aids, conducting projects, and other instances of teacher activity are valuable to the extent to which they evoke effective pupil learning activities. Educational procedures that place an excessive emphasis on instruction may be ineffectual, for learning is a self-active process. The nature of the *learner's activities* is the most important problem in educational method. To understand how human beings learn, as a consequence, is basic to the attainment of professional competence. Learning, of course, deals with more than academic mastery in a narrow sense. It is an integral part of nearly every aspect of the individual's development. For example, the forms of behavior which are characteristic of an individual's personality are in large part learned. One's attitudes, appreciations, values, interests, and dominant motives are likewise dependent upon experience and training.

If properly motivated so that he remains active over a sufficient length of time, a person will learn many things, even very difficult things, without guidance or tuition. But under such circumstances, although he may ultimately attain a desired end result, he may waste a great deal of time and energy in uneconomical methods of learning. He may never come to employ the most efficient means of performance. There are economical and uneconomical methods of learning; one of the functions of teaching is to guide students to use the most effective ones.

NEEDS AND OPPORTUNITIES FOR LEARNING

Learning Depends on Environmental Demands. Another important purpose of education and of teaching is to provide

both *needs* and *opportunities* for learning. The variety and specificity of human behavior are determined in very large part by the demands which the environment makes upon the individual. The child acquires knowledge and develops skill much more rapidly when these abilities are essential to the attainment of desired goals than when they are merely assigned tasks. This is one of the reasons why the modern reading program emphasizes that children should read for worth-while purposes. The specific skills and abilities of reading are conceived as means for getting thought and for putting the results of reading to some constructive use. These skills and abilities, however, are so complex that a large number of purposive reading activities, carefully graded, must be provided over a long period of time if they are to be mastered. Working together, the teacher and the pupil must formulate interesting and worth-while goals which will make a great variety of adjustments necessary and which will stimulate the acquisition of information, further understanding, and develop skill in many fields.

The importance of multiple environmental opportunities and demands is evident in the development of interests and social behavior. There are few, if any, innate or natural interests. On the contrary, interests are products of environment and culture. "Once we recognize," points out the child psychologist, "that the content of interests is created by the total environment in which the child is located, and see that there are only very few absolutely 'natural' interests, then it becomes clear that one of the important functions of the teacher is that of setting the stage for the child's interests by her own enthusiasms, spontaneity, and personal interests in activities and materials."¹ The movement to relate school work to the interests and needs of children is a significant advance, but teachers must remember that it is as important to stimulate new and productive interests as it is to capitalize the ones they already have at any time. To accomplish this the school should provide an environment rich in possibilities and vigorous in stimulation.

The individual's ability to interpret social situations and to respond to them adequately is also a function of the amount and diversity of experience he has had in reacting to other people. Here, as elsewhere, the ability to discern the relevant patterns and details in a situation develops with practice. As one observes the effect of his own behavior upon the reactions which others in turn make to him, he selects modes of social response that may persist into maturity. The socializing influence of the school environment, in and out of the classroom, is therefore one of its most pronounced educative forces. It follows that the school should deliberately try to create a variety of constructive social situations in which all children should be encouraged to participate. It should also strive to create a social atmosphere conducive to desirable social attitudes and wholesome relationships.

Competition and Cooperation Develop from Social Demands. Although it was once supposed that competitive behavior was instinctive and dominant over acquired cooperative tendencies, recent studies of the social development of children and adolescents reveal that both competitive and cooperative behavior grow out of the social demands made upon individuals and from the sanctions which the group places upon certain actions. Society often demands and rewards rather inconsistent response patterns. Under such conditions, the individual may develop correspondingly contradictory behavior. Observations of social development, for example, have shown that sympathetic behavior grows side by side with aggressive tendencies. "Children are taught at certain levels and in certain situations," one investigator points out, "to be social, considerate, sympathetic, polite, cooperative, and the like, and yet in other situations, the *emphasis* is on self-defense and other self-regarding behavior."² It is probable that competitive tendencies are no more innate than cooperative ones, and that both cooperative and competitive activities are learned in response to social requirements. The same author explains the process of social development as follows:

. . . we have no a priori basis for expecting sympathetic behavior to be more dependent upon learning than is angry behavior. At least, distress when others are distressed seems primitive, naive, and reasonably universal, without inculcation by adults. In both anger and sympathy, techniques of response are learned from grown-ups and child associates; the situations to which one may respond with the techniques thus acquired are also learned, and in each case the culture determines the amount as well as the character of the responses.³ . . . We may indeed say in general that sympathetic behavior increases relatively in any individual or group, and insofar as the situation is conducive to it.⁴

Development of Democratic and Autocratic Behavior. Recall in connection with the conclusion quoted above the study described in a previous chapter of the effect of democratic and autocratic atmospheres upon the behavior of junior high school boys, showing how definitely the form of social organization influences individual behavior and social relationships. Two groups of ten- and eleven-year-old boys were observed under conditions of authoritative direction and control by an adult leader in the one case, and under a democratic atmosphere of cooperative planning and execution among the boys and the leader in the other case. The autocratically controlled group developed greater hostility among the members; prompted solitary rather than social activity; and fostered personal dislikes, submissiveness, and resentment toward the leader. The democratic atmosphere, on the other hand, was much more conducive to cooperative activity, objective and impersonal reactions, more constructive effort, and a feeling of group membership.⁵

School Should Guide Development. The foregoing illustrations should be sufficient to emphasize the fact that, within the limits of his potentialities, the child may develop in several directions, depending upon the nature of his experience and training. It is the teacher's function to guide the developmental process. With an understanding that the task of the school is to provide needs and opportunities to learn, and to guide as

well as to stimulate the process, we turn in this and the next chapter to a discussion of the general characteristics of human learning. The two subsequent chapters will treat the conditions of economical learning, and still later sections will consider such specialized problems as the acquisition of meanings, the improvement of reasoning, and the means of making learning effective in new situations.

DEFINITION OF LEARNING

Learning is the modification of behavior through experience and training. It has already been pointed out that the individual learns when he *needs* to learn. This suggests that changes of performance take place in the process of satisfying motives or of attaining goals. What a person learns, however, may serve an immediate purpose but ultimately may not further his individual or social welfare. He may learn to write by clumsy methods, or to make unattractive facial grimaces, or to harbor too many emotional resentments, or to steal.

In its complex forms, learning often is a process of solving problems. Learning occurs when old ways of acting are incapable of overcoming obstacles or meeting new conditions. Thus it is a process of adjustment.

Certain terms in the statements of the preceding paragraphs need further interpretation. In referring to learning as modification of *behavior*, or changes in *performance*, one includes not only overt action—observable movements—but also such mental processes as thinking and imagining. In referring to the influence of *experience* and *training* one uses the former term in a broad and general sense, and the latter to represent the more systematic activities for which the school or some other educational agency takes responsibility. Finally, the definitions given above imply that learning, in its more complex forms, at least, is a function of *practice*. Practice must not be confused with exact repetition of a response, for such duplication rarely if ever occurs in the course of learning. Practice is really the repeated efforts of an individual to react to a situation effectively.

One could give many illustrations of changes in behavior with practice. For example, learning often takes the form of increased skill or precision in performance, or of an increase in the speed with which an act is executed. In the early stages of the development of a skilled performance, there are usually diffuse and irrelevant reactions, or awkward, unrhythmic, and poorly coordinated movements. With the proper sort of practice, however, the unnecessary responses usually drop out, and the poorly patterned reactions give way to smooth execution. One might describe this course of development by saying that learning is a process of improvement.

Learning also occurs when the details become explicit in a situation which the individual first grasps in only a general way. For example, the student may sense in broad outline certain relationships between production of goods and economic prosperity. As he explores the problem, however, he finds that a tremendous number of facts and processes must be considered before he fully understands the complex interrelationships of production, distribution, and consumption. Not only will some of his preliminary ideas become more explicit because of his greater grasp of factual detail, but other tentative conceptions will be revised in the process of exploring the problem and securing information about it.

Other forms of learning include such processes as observing more effectively, memorizing, understanding ideas and relationships, solving problems, acquiring appropriate forms of emotional expression and control, and developing interests, attitudes, and ideals.

Learning activities differ greatly in the extent to which the individual has to discover the appropriate response. In many instances, the situation and the response to be learned are identified for him. Learning a list of nonsense syllables involves little discovery and practically no meaning. Such an exercise is ordinarily called rote learning. Learning to recognize or use the word "doll" to represent a certain object is another case in which discovery of the correct response plays a minor role. Learning that $5 + 4 = 9$ might take place in the same

way that the word "doll" becomes attached to the object. But simple number combinations may also be learned by methods which stress discovery of the correct answer. For example, the child might count blocks or other objects, or derive one combination from another in meaningful fashion.

Examples of learning which involve a large element of discovering and understanding relationships are found in problem solving. Problem solving is a process in which the individual overcomes an obstacle to the satisfaction of a motive, or complex of motives. If the solution demands a complicated pattern of responses, or involves the reorganization of previous experience in a difficult fashion, so-called trial and error behavior ensues. In these instances, the critical questions are: (1) How do the correct responses appear in the first place, and then how are they recognized as correct, selected, and integrated into the proper pattern? (2) How are the incorrect or uneconomical reactions eliminated? (3) How is the complete performance stabilized so that it can be smoothly executed when necessary?

LEARNING AND MATURATION

Learning Depends on Level of Maturation. Both *maturat-ion* and *learning* contribute to the development of the person. The two processes are so closely interrelated that certain psychologists tend to use the term "growth" or "development" to include both. That learning involves growth is readily apparent when it is expressed in terms of improvement. But for practical purposes learning may be distinguished from maturation.

Maturation, it has been pointed out earlier, is growth that proceeds regularly within a wide range of environmental conditions, or that takes place without special conditions of stimulation, such as training and practice. Many activities appear in children's behavior in about the same order and at about the same time, even though the children have been subjected to rather great differences in environment. The appearance of these activities is closely associated with the physiological development of the organism. Learning, on the other hand, is a change in behavior that depends upon special conditions of

stimulation. What the child learns, therefore, depends to a great degree on the nature of the environment and the character of experience. Whether he acquires certain skills and abilities will depend upon the opportunities he has to learn them and the kind and amount of practice in which he engages. ✓

Maturation in Relation to Specific Training. Although a discussion of the developmental sequences in behavior that seem to depend largely on the growth of the individual has appeared in Chapter II, it may be well to review here, briefly, some of the typical experimental findings. Hilgard⁶ gave an experimental group of young children intensive training for twelve weeks in buttoning, cutting with scissors, and climbing a ladder. The control group received no training. When tested at the end of the training period, the experimental subjects were superior on all the tests to the control children. After one week of training, however, the control subjects reached a level of performance in climbing equal to that of the group which had had twelve weeks of special exercise. Although the improvement of the controls in one week of practice on buttoning and cutting was rapid, their score at the end of the week did not quite reach that of the experimental group. ✓

Strayer⁷ studied the relative efficiency of early and deferred vocabulary training for a pair of identical twins, T and C. In twenty-eight days of training, Twin C acquired a vocabulary equal to that which the other twin had developed in thirty-five days of training at an earlier age. However, at the end of the experimental period the twin T, whose training had begun five weeks earlier than twin C, was somewhat superior in vocabulary, pronunciation, and sentence construction, an advantage, nevertheless, which had disappeared three months later.

McGraw,⁸ also using the method of twin control, found that activities necessary for normal development were influenced little if at all by special practice. Such activities included crawling, walking, and prehension. Other behavior not necessary for normal growth, such as swimming, climbing, skating, jumping, and the like, was greatly influenced by training. Favorable attitudes toward the experimental tasks, which transferred to

other situations, constituted one of the most important differential outcomes of the training. One of the twins which McGraw experimented with was introduced to roller skates at the age of 350 days, and acquired at the age of 694 days, or less than two years, reactions which "consisted primarily of the broad, rhythmical, body sway which is characteristic of a professional skater." Her results indicate that specific training may be given either too early or too late for greatest effectiveness. Learning is not independent of maturation, but must be based upon a sufficient stage of growth. Practice is most productive when properly articulated with maturational level.

Apparently, the relative effects of maturation and training differ when improvement in specific and simple activities is compared with growth in a more complex skill. It was discovered that control children, untrained except for the necessary testing experience, fairly soon after the experimental period reached the level of performance of a comparable group given specific practice in color naming. The same was true for practice in strength of grip. Training of three-year-old children in singing, however, gave quite different results. In this case, instead of practicing specific tones, the children in the experimental group were encouraged to attempt new tones. The training covered a period of six months. At the end of this time, the trained subjects showed a marked superiority to the controls, and they were still superior when tested again several months later.⁹

These studies reveal that, under certain conditions, it is definitely advantageous to give young children training in skills for which maturing capacity alone is inadequate. The development of motor skills at early ages probably lays the foundation for greater proficiency in later performance. Furthermore, these activities give the child a greater control over his environment, and so enable him greatly to extend his experience. Early practice may also forestall the acquisition of habits which might interfere with the development of skills at a later time. Also, one of the most important purposes of encouraging the development of such skills as singing in young children is to

reveal special aptitudes which the school and the home should nurture.

Readiness to Learn. Research in mental growth and in the conditions of effective learning has called attention to the problem of *readiness* to learn a given task or to acquire skills and abilities along a wide front of experience. Readiness for learning to read, for example, is intimately related to the child's mental, physical, emotional, and social development. The child's mental age is by no means the only factor related to his ability to profit from reading instruction. The maturation of physical equipment, including the sensory and reacting mechanisms, is important, but, even in combination with mental age, does not provide an adequate basis for success in learning to read. There are many additional factors related to readiness, including the following:¹⁰ keen interest in reading, reasonably wide experience, facility in the use of ideas, ability to solve simple problems and to do abstract thinking of a very elementary type; ability to remember ideas, word forms, and the sounds of words; a reasonable range of vocabulary; command of simple English sentences; ability to discriminate word forms and word sounds; emotional stability; and some degree of social adjustment. A comprehensive investigation of reading readiness, involving sixty-eight different factors, showed that the following abilities were most predictive of success in learning to read: word recognition abilities; grasp of story structure; familiarity with printed words, letters, phonograms; and familiarity with auditory features of words shown by tests of rhyming, blending, and giving letter sounds. The authors of this study pointed out that "these are abilities which children can and do learn and which may be taught in the home or school."¹¹ The fact that the abilities most closely related to progress in beginning reading depend to a very great extent upon experience and training is of fundamental import. Preparing a child to read is certainly more than merely letting him grow; guidance and basic training are essential both in the preparatory stages and in the actual process of acquiring reading skills.

Grade Placement. Efforts have been made to determine the proper grade placement of arithmetic topics by finding the mental ages at which the requisite abilities are most effectively learned. As a result of these investigations, there has been a tendency to shift topics upward in the grades. For example, long division, which was commonly taught in the fourth grade, is now being postponed until the fifth. But readiness in arithmetic, like other activities, is a function not only of maturation, but also of previous experience, methods of learning, interests, attitudes, and purposes. Because of the complexity of the underlying learning factors, it is extremely difficult to assign a given task to a given grade or mental age. Preliminary investigation indicated that a mental age of six years and six months was necessary for efficient work in the early stages of reading. More recently, however, it has been shown that by adapting materials and methods to the individual, children less mature in mental age can make satisfactory progress. Gates found that several classes in which the average mental age ranged from five to seven years reached the same standard of reading achievement. He and his associates concluded, therefore, that "there is no mental age, within these limits at least, which can be set down as minimum or optimum for beginning reading in general." ¹²

Readiness Depends upon Stimulation and Training. The importance of stimulation and training in the development of readiness to learn is apparent in the extent to which pupils understand and appreciate literature. Children who have traveled widely, met many different people, and read extensively are likely to be much more mature in literary interests and comprehension than children with limited experience.

An environment that provides varied stimulation is likely to encourage not only intellectual interests, but also a wide range of skills. Children who are surrounded with automobiles and the many other mechanical inventions which are a common part of today's environment may have many more skills than those who lived in a previous period. At least the young people of today are likely to have different skills from those

which were learned under different patterns of environmental stimulation.

The foregoing illustrations make it clear that readiness is a complex of organic growth factors and the results of training and experience. The relative contribution of maturation of the organism and of previous learning in the acquisition of behavior at any one time is a function of the age and experience of the individual and the nature of the task. In preschool and primary school children, the level of inner growth undoubtedly plays a more significant role in learning than it does in later years. After middle, or at least after late adolescence, its influence is probably not very important. In considering the relation of experience to readiness, one must remember that previous learning may in some cases facilitate further adaptation, and in other cases tend to inhibit development.

In spite of the complexity of the readiness problem and the difficulty of assigning specific tasks to particular grade or mental age levels, the importance of adjusting the curriculum to the developmental stage of the individual must not be underemphasized. Successful performance is necessary for persistent and effective learning activity. But since successful performance is a function of so many factors, among which motivation is extremely potent, it is wiser to think of a range of grades or mental ages within which learning activities may be undertaken rather than to assign them arbitrarily to one grade or age. Furthermore, social demands may create needs on the part of children which would justify efforts to learn, carefully adjusted to the individual, somewhat earlier than the point of maximum economy of time and effort.

PROCESS OF LEARNING

Product and Process of Learning Distinguished. Remembering that learning is a form of *growth* that is correlated with special conditions of stimulation and practice should help one to understand the distinction between *product* and *process* of learning. Learning products are represented by such terms as "knowledge," "meanings," "skills," and "attitudes." The proc-

ess has to do with the course of development that takes place between the first attempts at performance and the ultimate stable behavior pattern. The ability to respond almost automatically with "9" to the situation " $5 + 4$ " is an *end result*. Studies of how children learn the combinations show conclusively that the individual's behavior changes with successive efforts to respond correctly and rapidly to a number situation.¹³ First of all, the ability to learn the simple number facts effectively depends upon a great deal of experience with concrete number. Making gross comparisons of "more," "less," "equal"; manipulating and counting real objects; and practicing the apprehension of concrete number in the form of dominos or other geometric patterns are important backgrounds for arithmetic readiness. Habituation of the addition, subtraction, multiplication, and division combinations is a final process preceded by progressively more mature forms of solution. These stages are (1) counting all the ones; (2) partial counting, such as "8, 9, 10, 11, 12"; grouping, such as "8 and 2 are 10 and 2 are 12"; and multiplication and conversion, such as "three 4's are 12," and "8 and 4 are 12, so 8 and 5 are 13."

Learning Is a Developmental Process. The fact that the child's overt behavior appears to be approximately the same when he repeats "8 and 4 are 12" over and over again merely disguises the underlying developmental process. If the child is asked to make from the beginning the exact response desired as the end product, he may resort to his own methods of making the situation meaningful and of arriving at solutions. Then without guidance he may habituate immature procedures such as counting or partial counting. Evidence indicates that more drill of the purely repetitive sort does not always take children who are using immature methods to the point of satisfactory mastery.¹⁴ In fact, purely repetitive methods of learning may actually foster undesirable forms of response which can be surmounted only with great difficulty. What the teacher who recognizes the fact of behavioral development will do is to *guide* the child's progress toward final stages.

Learning to recognize words meaningfully in reading also

illustrates the developmental nature of learning. Children no longer practice word recognition in lists, but in meaningful context. Word meanings grow, not by continuous repetition in the same situation, but by recognition and use in a variety of thought-getting activities.

A recent investigation of growth in understanding of geographical terms provides additional insight into the nature of conceptual development. One hundred children each in grades four to seven, inclusive, were tested on the meaning of geographical terms selected for the most part from their textbooks. The test battery included the essay and multiple-choice types, supplemented by a map identification examination and one requiring location of terms on a globe and on concrete models. The analysis of test results indicated that growth in understanding proceeded in the following ways: (1) through an increase in the number of different kinds of meanings; (2) through an increase of relevant general information; (3) through a substitution of basic for associated meanings, that is, through awareness of central, rather than marginal, meanings; (4) through the extension of central meanings to include more pertinent details; and (5) through a reduction in errors, or incorrect meanings and details.¹⁵

As research in human learning has turned more frequently from the laboratory to the schoolroom, from nonsense syllables to meaningful tasks, and from attention to how individuals learn as well as to what they learn, the genetic character of learning plainly emerges. Learning and maturation are two aspects of the fundamental process of individual development.

Learning as Improvement. The fact of progressive change in the response pattern in the acquisition of skill has always been much more apparent than in ideational learning. Obviously, the individual cannot practice, try as he may, the final precise form of a complex act, such as driving in golf, from the beginning. Furthermore, if practice meant sheer repetition, he would never attain a skilled performance, for he would reproduce continuously all the errors and inadequacies of his first trial. Observation of the development of skilled behavior leads

to a definition of learning as a series of progressive approximations to a successful performance. It is now becoming equally apparent that learning means improvement, not only in the acquisition of skill, but also in such fields as arithmetical computation, word meanings, and geographical and historical information and understandings. Development is a pervasive characteristic of human learning.

INTENT TO LEARN

Since learning is such a complex process, it is not surprising that it takes place most surely when one *intends* to learn and remember. We are often able to recall, of course, many of the things that have been in the margin, rather than the center, of attention. But this kind of *incidental* learning is not trustworthy. The results are too accidental and unreliable. Sometimes only passing reference or casual observation will be sufficient to learn; more often they will be ineffective. Experiments have demonstrated that one is often unable to recall many details of objects he has handled numberless times or of scenes he has passed regularly. These facts suggest that the safest procedure is to attend directly to the important facts and principles or the essential skills to be acquired.

How is this conclusion to be reconciled with proposals for having pupils learn indispensable skills and abilities in spelling, reading, language, arithmetic, and other subjects incidentally, that is, not by special study of these subjects as such, but by using the material in connection with some other purposeful activities. This issue is raised by such questions as the following: Can one dispense with specific instruction in spelling, and expect the individual to learn to spell through activities in language and reading? Is it possible to master the rather difficult understandings and abilities involved in handling decimals when they are practiced only in connection with activities or projects as computing exact distances, or determining trends in rainfall?

In asking and answering such questions as these, it is unfor-

fortunate that the word "incidental" has been so commonly used, for it connotes "undeliberate" or "inattentive." The essential skills and abilities in spelling, reading, language, and mathematics are extremely complicated and highly organized. The fact that they should be acquired in the service of purposes which are broader in their significance than the tools themselves does not mean that they can be learned casually. Before the child can advance beyond the earliest stages of reading, he must get conscious control over the means of distinguishing one word from another. One of these techniques is phonic analysis. Although this skill should be learned in meaningful context, it must be acquired by explicit, well-directed effort. It is customary now to develop a recognition-knowledge of the vocabulary and grammar of a foreign language in the course of actual reading, but it is necessary, nevertheless, to direct attention to verb forms and other inflections, and ultimately to sense the structure of the language by organizing and generalizing specific experiences. Understanding arithmetical processes logically or mathematically is probably essential for using them intelligently and accurately in social situations. Decimals, for example, should be learned not only in connection with useful applications, but as a phase of meaningful manipulation of the decimal number system.

These considerations indicate the importance, not so much of *incidental*, as of *instrumental*, learning. The distinction is an important one, for the latter adjective suggests not only that skills and abilities should be acquired as means to ends, but that they should be the object of deliberate, intentional learning. Dewey has expressed this principle succinctly in the following fashion: "Intelligent activity is distinguished from aimless activity by the fact that it involves *selection* of means . . . out of the variety of conditions that are present, and their arrangement . . . to reach an intended aim or purpose."¹⁶ The selection and arrangement of means certainly implies deliberate and attentive behavior. We may agree with Horn when he concludes that "whatever subject matter is of little value

may be left to incidental learning, but what is to be remembered should at some time be in the focus of the student's attention and subjected to his determination to remember it." ¹⁷

Attitudes which are characteristic ways of reacting to objects, persons, or situations, often have a strong emotional component, and seem often to be somewhat less dependent upon intention and definite practice than other learning outcomes. For example, without exactly intending to do so, one may develop strongly favorable or unfavorable dispositions toward a school subject, or toward school tasks in general. Unlike understandings and skills, such attitudes appear to be more influenced by the general tone and atmosphere of the environment than by direct and formal instruction. In some instances, they may take form from one experience, in contrast to the extended effort necessary to acquire skills and understandings. The effect of the situation as a whole upon emotionalized attitudes was undoubtedly what Dewey had in mind when he wrote the following passage: ¹⁸

Perhaps the greatest of all pedagogical fallacies is the notion that a person learns only the particular thing he is studying at the time. Collateral learning in the way of formation of enduring attitudes, of likes and dislikes, may be and often is much more important than the spelling lesson or lesson in geography or history that is learned. For these attitudes are fundamentally what count in the future. The most important thing that can be formed is that of desire to go on learning.

This interest in learning, coupled with conscious acquisition and control of the methods of economical learning (which are the product of deliberate effort and specific attention during learning experiences) are the best guarantees of continued independent growth.

MOTIVATION

Some discussions of the dynamics of learning seem to imply that motivation is something "added" to an otherwise apathetic attempt at learning in order to speed up and sustain the process. Such an interpretation is untrue, for basically there is no

such thing as unmotivated learning. Efforts to improve, it is true, are more or less energized, or well or poorly directed, but the differences are of degree and not of kind. Motivation is the *sine qua non* of learning.

Motives are conditions—"physiological" and "psychological"—within the organism that dispose it to act in certain ways. Motives take a variety of forms and are designated by many different terms, such as needs, desires, tensions, sets, determining tendencies, attitudes, interests, persisting stimuli, and so on. The notion of tension is a useful one, suggesting as it does a state of disequilibrium which, if it persists long enough and is strong enough, disposes the organism to do something to remove the stimulating condition, or to "satisfy" the motive. McGeoch¹⁹ defines a motive as "any condition of an individual which points or orients him toward the practice of a given task and which defines the adequacy of his activities and the completion of the task."

Incentives are not motives in a strict sense, but are objects or situations which when attained will have the possibility of satisfying motivating conditions. In actual learning situations, of course, motives and incentives are both involved, and are often referred to in the psychological literature as "motive-incentive conditions."

To make an inventory of human motives is an extremely difficult task. If one is content with a list of the organic cravings, such as hunger, thirst, sex, and the like, the problem is relatively simple. An attempt to enumerate secondary drives, such as the desire for social recognition and approval, the need for a feeling of personal worth, and the desire for effective effort, is much more complicated, for the list becomes extensive. Although psychologists once offered lists of "instincts" as basic motives they now generally recognize the futility of trying to distinguish "innate" from "acquired" drives. It is still fairly common, however, to state that the wealth of interests and activities which motivate mature behavior are grafted, even if remotely, upon the basic organic cravings. It is probably better to assume that what actually occurs is that "an elaborate proc-

ess of learning and growth intervenes between the organic wants of infancy and the cultural wants of adulthood, involving all manner of linguistic, imagined, and rational factors that ultimately transform the segmental cravings of infancy into desires having no longer any functional connection with them, but holding in their own right an autonomous place in personal life." ²⁰ Teachers will find it profitable to base their procedures on the proposition that "motives are almost infinitely varied among men, not only in form but in substance. Not four wishes, nor eighteen propensities, nor any and all combinations of these, even with their extensions and variations, seem adequate to account for the endless variety of goals sought by an endless variety of mortals." ²¹ Everyday motives are functionally independent of their *instinctive* origins, just as a tree, though it started as a seed, is functionally independent of it.

For the purpose of stimulating learning, it is unnecessary to distinguish—even if it were possible—original from acquired motivations. It is essential for the teacher to know *what* "springs to action" might be unleashed in a given individual, and how to capitalize them by the situation at hand. Perhaps the most successful efforts to adapt the materials of instruction to the learner's interests have been in elementary school reading, both in the basic textbook series and in books for extensive reading. Excellent studies of children's interests have provided the basis for this achievement. The "experience approach" to literature in the secondary school is also bringing it closer to the needs and problems of adolescents. Writers of science textbooks for junior and senior high schools have tried to answer questions which secondary students themselves have asked. The study of the community, and the organization of sociological, political, and economic facts and principles around contemporary problems, have made the social studies more interesting and realistic at both elementary and secondary levels. Certain educators recently have made proposals to organize the program of the high school as a whole around the needs and characteristics of adolescents.

It would be shortsighted, of course, for the school merely to

feed the present interests and motives of its pupils. The wants, interests, and attitudes of the individual at any moment are the means of making experience meaningful and worth-while. Out of these experiences, however, new interests and more mature purposes and values should emerge. Dewey has made it clear that we learn through experience, but that not all experience is educative. Activities which, though significant to the person at the time, also lead into more intelligent behavior and open up further means of growth are the ones which the school should encourage. No sensible person would encourage boys who are absorbed in making model airplanes to spend all their time that way. A shrewd teacher, however, might use that interest to activate the study of science, art, social studies, and literature. Aeronautical engineering is applied science. Airplane design is a problem in art as well as in engineering. Aviation has had a profound effect on international relations; the airplane has remade the boundaries and destinies of nations and empires. Charles Lindbergh's *We* and Anne Lindbergh's *Listen: The Wind and North to the Orient* transform adventurous air travel into literary experience. Thus may interests and motives of the present make bridges to activities and desires of the future.

Functions of Motives. Motives serve three functions in the learning process. First, they energize behavior. Motives release energy and arouse activity. Thus such bodily conditions as thirst and hunger induce muscular and glandular reactions and even ideational responses which through experience have become related to organic conditions. External stimuli in cooperation with internal conditions, evoke adjustive behavior. Such incentives as praise, reproof, reward, punishment, money, and food are motivating factors. Fortunately, man is capable of foresight or expectation. He can anticipate future conditions or results. Thus he formulates goals, and his definition and anticipation of these purposes are powerful motive-incentive conditions.

Some motives and incentives energize behavior more than others. Teachers have often given gold stars for books read or

tasks mastered. These rewards are likely soon to lose their potency. Furthermore, if reading books proves intrinsically worth-while by providing enjoyment or the knowledge with which to accomplish some important end, stars are unnecessary. School marks may sustain a modicum of effort during the period of formal education, but unless learning has become interesting in itself and instrumental to the satisfaction of felt needs, intellectual growth will probably cease with the end of schooling. Fortunately, activities which at first are supported by extrinsic incentives or formal regulations may become intrinsically interesting. This transformation happens all too infrequently, however, because most of the conventional goals which schools apply are forms of compulsion. It is quite possible for the aversive attitudes often stimulated by these forces to spread to the activities involved and taint them.

Selective Function of Motives. In the second place, interests and motives are selectors or determining tendencies. They dispose the individual to react to some situations and to ignore others; they determine in considerable part *how* he will react to certain situations.

When an interest system has been formed it not only creates a tensional condition that may be readily aroused, leading to overt conduct in some way satisfying to the interest, but it also acts as a silent agent for selecting and directing any behavior related to it. Take the case of people with strongly marked esthetic interests . . . in scanning a newspaper they will observe and remember more items pertaining to art; they also take a greater interest in clothes than do non-esthetic people; and when they are asked to rate the virtues of others, they place esthetic qualities high. In short the existence of a well-established acquired interest exerts a directive and determining effect on conduct just as is to be expected of any dynamic system. . . . (Allport).²²

Human beings are always acting selectively. When reading for a certain purpose, for example, one attends primarily to those statements which are relevant to it, and is only cursorily aware of other parts of the selection. Scanning is a search for material bearing upon a specific topic or problem; one stops

to read carefully only the sections which are especially pertinent. Several persons may give very different reports of a lecture, for they may have attended it for different purposes, have approached it with varied interests, or have interpreted it through different backgrounds of experience. These phenomena, results of the selective operation of *mental sets*, emphasize the importance in learning of clearly defining the task. Merely "reading a lesson" or just practicing is a poor way to learn. Efficient study is purposeful study directed toward explicit goals.

Even rats act selectively on the basis of differential motivations. This has been demonstrated by having the animals first learn that by taking one direction they secure food and by going in a different direction they find water. Afterward, when the animals are given a choice of these two responses, they take the one direction when hungry, and make the other reaction when thirsty.²³ In both rats and men, motivations and incentives determine the *utilization of previously learned responses*.

There is another important way in which motivation determines selection of response. When the organism is acting under the impulsion of a strong motive and encounters an obstacle to the satisfaction of the need, it "tries" one reaction after another until the motivational tension is relieved. After repeated occurrences of substantially the same motivating and thwarting conditions, the ineffective trials tend to drop out, and the organism makes the successful response at once. *Reactions are selected and learned because they are functionally related to wants and motives.*

Motives Direct Behavior. Closely associated with the selective function of motives is their role in *directing* behavior. It is not enough for an organism to be active. The energy released and behavior evoked by hunger are ineffective unless action is directed toward some object that is capable of satisfying the drive. Complacent persons learn very little, but to make them dissatisfied with their present condition is not enough to ensure effective growth. It is when their energies converge upon well-defined and attainable goals that improvement takes

place. This principle has far-reaching implications for educational procedures.

Instruction in oral and written composition has been notoriously inefficient in relation to the great amount of time the schools at all levels have devoted to it. Half the battle of teaching and learning would be won by creating an interest in improvement and making correct usage and effective expression a desirable goal in itself, or essential for the attainment of other valued ends. Time spent in drilling perfunctorily on exercises in correctness is mostly wasted. Conventional theme-writing assignments, equally purposeless, should be replaced by having students write the things they want and need to write. Recently a student asked one of the instructors in a writing laboratory when a letter written in the laboratory and submitted for final appraisal would be returned. The instructor replied that press of other work made it necessary to postpone correction of the papers for several days. "But I must mail my letter at once," insisted the student. Compare the urge to write represented in the realism of preparing a good letter to mail with that generated in a formal composition class where, too often, the student writes on a topic of little concern to him for an instructor who, he knows, does not want to read his paper. The requisites for improvement in speaking and writing are something to say, clearly thought through; a real desire to communicate these ideas; and an audience to which to address them.

However, these conditions, essential as they are, are not sufficient. Goals and purposes must be clearly perceived, not only with respect to the broad pattern of response, but also with regard to significant details of performance. If training in expository writing, for example, is to be most fruitful, both teacher and pupil must have an explicit, reasonably expanded and concrete statement of the characteristics of good composition. Instructors in the writing laboratory referred to above aid the student to make a deliberate choice of methods for realizing his purposes in each piece of writing.²⁴ The successful adaptation of means to end, the economical learning of

techniques, and persistent motivation necessitate a knowledge of just what the characteristics of a successful performance are.

College students often make poor scholastic records because they see no relation between their studies at the moment and their ultimate objectives. For example, the relevance of work in the basic sciences to medical subjects is frequently not understood by the premedical student. Likewise, courses in education are often not very significant to students who have had no actual contact with problems of teaching. One of the most important functions of the teacher is to reveal to students the instrumental value of what they are asked to study.

Learning cannot be successful or efficient without persistent selective, and purposeful effort. There is no more important problem in teaching, therefore, than that of motivation. This means, as Dewey points out, that "attentive care must be given to the conditions which give each experience a worthwhile meaning." Learning experiences are meaningful when they are related to the individual's interests, when they are involved in his living, when they not only contribute to his purposes at the time but enable him to make more intelligent adjustments in the future, when they involve discovery and problem solving rather than formal drill or mere memorization, and when they result in satisfying social relationships. Teachers and pupils, working cooperatively, should set up goals which will make that kind of learning possible and necessary, and together plan the effective means of realizing these purposes. To do so will take time, but it will not be wasted time, for the preparatory and initial stages of learning constitute an essential orientation for the process as a whole.

SUMMARY

Learning is modification of behavior through experience. What man learns is determined on the one hand by his constitution, and on the other by the demands which the environment makes upon him. Of all the animals, man is the most flexible. He inherits relatively few fixed ways of reacting. His interests, attitudes, appreciations, skills, and abilities are pri-

marily the product of learning. Although the limits of his development and the foundations of his special talents are set by hereditary factors, the extent to which these potential attainments are realized depends upon environment and training. Whether an individual is interested in science or in history, whether he likes school or finds it distasteful, whether he is "conservative" or "liberal" in his social attitudes, whether he is honest or untrustworthy, whether he considers a "lick and a promise" enough or is satisfied only with work well done, whether he studies effectively or uses inefficient methods of learning, is determined in very great degree by the nature of his experience.

Since the child may develop in several directions, depending upon the character of his experience, it is essential for the school to guide his development. Children don't just grow. Growth is a response to stimulation. The particular behavior patterns an individual acquires are therefore the result of specific forms of experience. Furthermore, there is no reason to believe that an immature person will be able to originate or to choose all or the best educational activities that are instrumental to the acquisition of desirable forms of behavior. The school exists for the purpose of providing a carefully planned sequence of experiences calculated to make the most of each individual's potentialities. It is not a reprehensible intrusion for the teacher to guide the pupil's development, provided she respects always the integrity of the child's personality, enlists his initiative and active participation, and is careful to see that each activity is a meaningful and worthwhile experience for him. On the contrary, it is the definite responsibility of mature persons to lead the young into activities which are really educative, which will result in progressive development in desirable directions.

The effectiveness of learning activities depends upon the level of inner growth which the organism has attained (maturation) and also upon the results of previous learning and experience. Each new learning situation should be relevant to the pupil's level of mental development and previous achieve-

ment, as well as to his methods of learning, interests, attitudes, and purposes. This means, of course, that education at all ages must be individualized much more extensively than it now ordinarily is. Pupils vary greatly in all the factors that underlie readiness to learn any given task. Grade placement of learning activities can be related only to the expected level of development of the "average" pupil. Within each grade, regardless of whether liberal or strict promotion policies obtain, there must be adaptation of curriculum to individual pupils. Each one should take the step for which he is ready. Within any one grade, some persons will progress much more rapidly than others; the members of the grade will start the year and end the year at widely varying points.

Learning is a process of improvement. Progress, however, depends upon the intent or the will to learn. Incidental learning, that is, learning which is not deliberate or purposeful, is not reliable; the individual may learn or he may not. Whatever one wishes to learn surely he should learn systematically and designedly. Instrumental learning, in other words activity which is a carefully and intentionally chosen means to some desired end, is not incidental. It is highly conscious and definitely purposeful.

Motivation is an essential condition of learning. Motive-incentive conditions which are significant in the educative process include interests, attitudes, needs, and purposes. Such factors as these energize behavior, make it selective, and direct it toward certain ends. Learning is most efficient when the activities to be performed are the means of satisfying needs or attaining important goals. Education must do more, however, than cater to the present interests and purposes of the individual. The great variety of motives in human behavior is brought about by learning, and it is therefore the function of education to stimulate the development of new, more mature, and more productive interests and purposes.

QUESTIONS AND EXERCISES

1. Interpret the proverb, "You can lead a horse to water but you can't make him drink," with respect to a principle of educational procedure discussed in this chapter.
2. Can you give examples of two "natural interests" which children have? How, in view of your examples, have you chosen to define "natural interests"?
3. What might be the effect of punishing a child by making him stay in after school to write all misspelled words twenty times each?
4. From your own school experience give examples of the three ways mentioned in this chapter that motives function in the learning process.
5. Turn to the outline of this chapter in the Table of Contents, and summarize in one sentence what you consider to be the most important feature of each section.
6. Define a motive. Which of the following could satisfy the definition: (a) A tickle in the throat; (b) The idea of becoming a fine singer; (c) A toothache; (d) The habit of sleeping after a meal; (e) The desire to do and say funny things.
7. Suggest three situations in which a child may do incidental, emotional learning in the course of class activity. Draw a diagram to show how this occurs. To what extent can a teacher control attitudinal learning?
8. Explain the statement in this chapter that "motivation is the *sine qua non* of learning." Under what circumstances, if any, can a child go to school and yet learn nothing? (a) If he is mentally very dull? (b) If he is disobedient and resentful toward the teacher? (c) If he is so exceptional that he is years, mentally, beyond his brightest classmates? (d) If he seems too indolent to try?
9. Do you agree with the statement, "Artificial incentives such as gold stars, honor rolls and prizes have no legitimate place in modern educational practice"? Explain your position.
10. Under what conditions do you think a "democratic" organization can be used successfully with school children: (a) for a boys' club meeting? (b) for a spelling lesson? (c) for a standardized achievement test? (d) for a geography project? (e) when the school superintendent is visiting the classroom?

11. Defend and then criticize the proposition that in order to get through school sooner children should begin their first grade work at five years of age.
12. In what way did the old-fashioned one-room schoolhouse provide opportunities for learning that are lacking in many of our present-day schools? How are opportunities for learning provided for exceptional children in modern schools?
13. In what respects is the learning of animals like that of man? In what respects is it different?
14. Cite instances in which both competition and cooperation are taught in practically the same learning situation.
15. Is the problem of maturation one which applies only to the learning of young children? Do you think there are forms of learning which depend on maturation in adult years? Under what circumstances?
16. Name a dozen things which people do to secure social approval. Evaluate the strength of this impulse. Trace its development to maturity.
17. Why did psychologists at one time regard the distinction between an instinct and an acquired drive one of great significance? What is the usual attitude now?
18. There have been various doctrines based on the assumption that "nature is right, there can be no higher criterion." It is asserted therefore that children should be permitted to develop without inhibition, that they should be permitted to do whatever is "natural" for them to do, on the assumption that nature is infallible, that no natural trends can be undesirable. In the light of available facts, how valid is this doctrine?

GENERAL REFERENCES

For an excellent discussion of the way activities, not originally interesting, come to have intrinsic value see:

Allport, G., *Personality*, Henry Holt & Co., 1937, Ch. 7, "The Transformation of Motives."

The importance of motivation in the course of learning and in the development of the individual personality is well discussed and illustrated in the following:

CHAPTER X



THE GENERAL NATURE OF LEARNING—II

In understanding human learning, it is more instructive to discover what happens when the individual attacks a rather complicated situation than when he memorizes a list of nonsense syllables, which is often called rote learning. In the former case, the critical problems have to do with the *discovery or appearance* of the correct responses, the *selection* of the appropriate reactions and the *elimination* of the incorrect ones, and the *organization and stabilization* of the adequate reaction pattern.¹

FEATURES OF LEARNING IN COMPLEX TASKS

“Trial-and-Error” Behavior. When the problem or motivating situation which confronts the individual is such that no ready-made response is adequate for solution, or is so complex that previously learned reactions cannot be easily integrated for managing it, what has ordinarily been called trial-and-error behavior ensues. “Trial-and-error behavior,” however, is a misleading term. The responses which human beings make to problem situations are seldom if ever entirely random. They are often fairly systematic and usually somewhat relevant, at least, to the situation at hand. Motivating conditions—the organic state of the organism; the attitudes, interests, the sets and readinesses, particularly the goal sets of the person—serve to narrow the range of responses that might be made. The individual’s perception of the situation, his interpretation of it, his identification of its significant aspects, also help to determine what responses out of all those previously learned he will try out. The trials, therefore, are not chance reactions, but often are systematic variations or attempts at solution.

The more explicitly one defines the goal to be attained and the more carefully he searches for relevant previous experiences, the more fruitful the successive attempts at solution will be. Other things being equal, the greater the number and variety of possibly useful attempts, the greater the opportunity for the successful responses to occur.

The Role of Exploration. Before the essential cues or relations in a problem situation can be fully perceived, or in many instances even vaguely sensed, exploration and manipulation may be necessary. An episode which Köhler describes in his *Mentality of Apes*² illustrates this function of multiple responding. The ape, reaching through the bars of his cage, struggled unsuccessfully to secure a banana lying just beyond the length of his arms. On the other side of the cage, *outside the ape's vision* as he was looking at the fruit, was a stick with which he could have pulled in the banana. Giving up, the ape turned away, looked at the stick and even stepped on it. But he saw no relation between the tool and his recent objective. However, when the experimenter moved the stick to the other side of the cage, so the ape could see it in the same field with the banana, the animal perceived the relation at once, brought past experiences into play, and used the pole to haul in the fruit.

Exploration and manipulation may serve to bring objects into a field, or to rearrange the objects within a field, so that their relations, once obscure, become apparent. This is probably also true of problem solving, which proceeds more with verbal or ideational tools and relations than with overt responses. Mulling over a problem, exploring it systematically, "rearranging the ideas," so to speak, may make the emergence of patterns and meanings possible. Finally, systematic exploration and manipulation demand an aggressive attack upon a problem which is almost certain to be more fruitful than less alert and active inspection. Many persons fail to solve problems either because they give up too soon or because they accept the first "hunch" or an early attempt which is either wrong or inadequate.

These considerations make it clear that if trial-and-error behavior takes the form of systematic variation of response, or of "trying this or that lead to the goal," it is something not to be disparaged, but encouraged. As exploration proceeds and successive attempts to respond adequately are made, the situation is more fully perceived, and the amount of trial-and-error behavior is correspondingly reduced.

How Responses are Selected. During successive trials, how do selection of correct responses and elimination of incorrect reactions take place? The cue to the solution of this problem can be found in the following illustration. A certain wrestling coach, whose work with the "varsity" group left little time to train the freshman team, showed the first year squad a few "holds," and then told them to wrestle without supervision until he could return. Sometime later, he found that the freshmen had discovered several useful procedures in addition to the ones he had showed them earlier, and that they had also picked up certain acts which were undesirable but which they continued to perform. The chances were also that in their unsupervised practice they had happened upon certain disadvantageous movements which they had eliminated, and had stumbled upon some serviceable acts which they had discarded as well. Why had they selected and retained both advantageous and disadvantageous responses? Why had they eliminated both serviceable and unprofitable performances?

The reasons probably are as follows: The wrestlers had selected advantageous responses because they recognized their desirable consequences; they had undoubtedly discarded other desirable acts because these responses had not produced results at the time, or their ultimate consequences were too remote to be recognized. The students had eliminated certain movements because these responses led to disastrous results. They had retained certain disadvantageous procedures because they had not discerned the relationship between these acts and the unfortunate situations to which they ultimately led.

Responses are selected, then, because of their consequences. During the varied reactions which individuals make to prob-

lem situations, certain performances may satisfy the motivating conditions which made adjustment necessary. Such responses tend to be selected and learned, and those which do not serve this function, or actually increase the tension, tend to drop out with successive trials. *Looked at from another angle, we select and learn those responses which are instrumental to the attainment of goals and purposes.*

THE LAW OF EFFECT

Thorndike has explained the selection and elimination of responses by the so-called "law of effect." According to this principle, responses that are accompanied by satisfying states of affairs (that is, those which the organism strives to attain or maintain) are selected and learned. Originally Thorndike included in the law the correlative conclusion that responses whose after-effects are annoying (states that the organism attempts to avoid or replace) are eliminated in the course of successive trials. His recent research, however, while it has confirmed the positive influence of satisfying consequences, has shown that annoyers do not weaken connections between situation and response, and are mainly useful in shifting the learner to some other response which may be correct and satisfying. "In all these experiments," Thorndike reports, "useful learning occurs almost or quite exclusively by strengthening of certain connections * by satisfying after-effects."³

Unfortunately, the law of effect has often been interpreted as referring to the influence of *affective concomitants* (feeling accompaniments such as pleasure and pain) of a response rather than its *functional consequences*. Actually, human beings can tolerate considerable unpleasantness or annoyance as immediate after-effects of responses if they consider that these reactions are instrumental to the attainment of a highly valued goal. Recent research has demonstrated that learning sometimes can actually be facilitated by punishing correct reactions. Learning experiments have frequently employed electric shocks as

* "Connections" means tendencies to respond in certain ways to given situations.

punishments which supposedly induced annoying after-effects. It has been discovered that in certain learning situations shocking the subjects when they made right responses was as efficacious as shocking them for the wrong ones.⁴ The reason these reactions were learned in spite of their apparently annoying after-effects is that the subjects discovered that they were the right paths to the objective.⁵ If one is to agree that "a process of learning is modified definitely by the consequences incurred," one must interpret consequences to refer fundamentally to the functional relation between the responses and the motivating conditions or between means and end.

LEARNING AS GOAL-DIRECTED ACTIVITY

Selection of Responses in Terms of the Goal. The principle that responses are selected and organized in terms of their relevance to the learner's goal has far-reaching implications for educational method. The fact that the acquisition of skill may be described as a series of successive approximations to a successful performance has already been pointed out. This statement indicates that if his practice is to be effective, the learner must have a clear picture of the successful performance, or as definite a knowledge as possible of the appropriate standards, *in advance*. *The first step in economical learning, in other words, is to establish the goal as clearly and explicitly as possible.* Then, after each attempt to execute the skilled behavior pattern, the learner must gauge the success of his performance by reference to the objective and *adapt his responses in the next trial in the light of this evaluation.* As he strives to make his activity conform more and more closely to the standard, the goal itself becomes more explicit, and this increased clarity, in turn, facilitates the proper modification of the subsequent responses.

Even after one has attained a high degree of skill in some activity, such as golf, his performance may go wrong. To diagnose the difficulty and eliminate the troublesome reactions, he must try to relate acts and consequences. Because it is often difficult to discern these means-consequence relations, the good

golfer sometimes needs to have another capable observer identify them for him. Likewise, to improve his game, the player must discover and select those procedures which will lead to desirable ends; for this purpose, guidance or tuition of the right sort is also often essential.

Means-End Relations in Learning English. The field of English provides numerous illustrations of the significance of means-end relations in learning. Certainly, the first thing one must do before speaking or writing is to determine exactly what meanings he wishes to convey, what reactions he hopes to evoke from the audience. Then it is necessary to select the techniques of organization, presentation, and correctness necessary for the attainment of his purpose. If learning how to communicate ideas proceeds in this functional fashion, the student ultimately should acquire the ability deliberately and intelligently to choose the effective means for expressing his thoughts.

Vigorous, and sometimes acrimonious, debates are going on about the teaching of grammar. From the point of view of composition, the only reason for teaching grammar is to improve oral and written expression. Nevertheless, many teachers require students to learn the grammar of constructions in which persons very seldom if ever make errors. Evidence indicates also that it is extremely difficult to make a knowledge of grammar function in speaking and writing. Grammar, like any other phase of language, must be taught as a means of "clarity of thought and effectiveness of expression." When the emphasis is on conveying meaning, the student can easily correct the sentence: "I saw the house coming around the corner." An experimental study of the relative efficacy of a grammatical versus a *thought* approach to the improvement of sentence structure has shown, as a matter of fact, that it is unnecessary to require the student to learn the grammatical terms and principles involved in the correct placement of participial phrases like that in the sentence quoted above. The meaning the sentence intends to convey determines the placement of the modifier.⁶

Punctuation should also be approached as the means of

clarifying the relations among written ideas so that the reader can sense the meaning correctly. In the sentences which follow, the "comma has changed the meaning and the meaning has changed the grammar:

Don't take that collar off Peter.

Don't take that collar off, Peter.

Here again, the means is determined by the end. When students find that commas are necessary to make meaning clear, they learn without great difficulty to use them intelligently.⁷

Outcomes Determine Teaching and Learning Activities.

Just as the learner must have a definite goal in order to work effectively, the teacher must decide upon outcomes to be attained by pupils before he can determine what learning activities they should engage in. For example, different basic objectives for the study of foreign language demand different teaching and learning procedures. If reading ability is chosen as the principal outcome, the conventional grammar-translation methods of teaching will prove relatively ineffective. The student should acquire his knowledge of vocabulary in the process of reading, and learn whatever grammar is necessary for adequate comprehension. Furthermore, for the purpose of reading, a recognition-knowledge of grammar will be sufficient. If the objective is to write the language, on the other hand, the much more difficult ability to recall the necessary grammatical forms must be developed.

The Learner's Role in Purposing. By substituting purposeful and meaningful activities for routine memorization and formal drill, the modern school has recognized that human beings learn those things which satisfy their needs and take them toward their goals. To act intelligently, one adapts means to ends. To learn energetically, one needs to desire these goals strongly. This is the reason why Dewey has declared that there is "no point in the philosophy of progressive education which is sounder than its emphasis upon the importance of the participation of the learner in the formation of the purposes which direct his activities in the learning process. . . ." ⁸ Dewey has

also explained that the school has frequently failed to make children's tasks meaningful because it has neglected to make what is to be learned a means of realizing pupils' purposes. School work, to the pupil, is too often just a series of assigned tasks which call for "mechanical dexterity in applying set rules and manipulating symbols." Understanding comes, on the contrary, from discovering what information or what skills are necessary for attaining a desired end, or from determining the consequences or the uses or the implications of what is being learned.

INSIGHT

Learning Involves Insight. Discovering and using means-end relations is an example of *insightful learning*. There are some forms of learning which are characterized by insight in relatively negligible degree. Many responses which we make to situations are essentially arbitrary so far as any intrinsic relation or belonging between the two is concerned. Learning names for objects by children is an example. So far as the child is concerned, "noll" would do just as well as "doll" for the object if we chose to give it the former name. There are many specific associations or connections between situation and response that are acquired in much the same fashion as learning names for the objects of the everyday environment.

An opportunity for insight is provided in more complicated learning situations involving relations among the parts and between the parts and the whole. Relations take a variety of forms; they may be causal, spatial, or temporal. The importance of means-end relations was stressed in the preceding section of this chapter. Part-whole relations are particularly significant. Thus the meaning of a given word depends on the context of the sentence in which it occurs, and the sentence on the paragraph of which it is a part. Sentences taken out of their context often give an impression different from what the author intended. The relations between parts are dependent upon an organizing pattern or larger whole. For example, the *particular*

relation between 5 and 10 as specific items is different in the series 5-10-15-20 from what it is in the sequence 5-10-20-40.

Simply stated, learning activities are insightful when they enable the individual to see into the situation, to understand it as a whole. In a problem situation, insight means the emergence of a complete solution. From another point of view, insight characterizes learning when the individual's behavior is fully organized with respect to the goal. Some writers have insisted that suddenness of appearance is an essential criterion of insight. Often solutions do occur suddenly; everything falls together into a coherent pattern, and, like a flash, the individual says, "Oh, I see!" Frequently, however, one can see only part of the way into the problem; perhaps the goal itself is still only vaguely defined. Certain relations in a complicated puzzle, for example, become apparent before all the pieces fit together. It seems reasonable, therefore, to speak of gradual or partial insight, perhaps even to recognize degrees of insight. Not infrequently, insight comes as a matter of "hindsight" rather than "foresight." In other words, appropriate responses often occur more or less accidentally, and their instrumental value or relevance is perceived after their occurrence. The point to remember, however, is that learning is really complete or adequate only when the individual grasps the scheme of a solution or performance as a whole, when each phase of the total pattern fits in neatly, and the individual has apprehended the essential relations of all aspects of the situation.

Transfer as a Criterion of Insight. When behavior with respect to a problem is fully organized, one can proceed directly to the goal without incorrect responses or diffuse and awkward movements. Another criterion of the appearance of insight has been called transposability, which means that the essential principle of a solution can be recognized or applied in other particulars than those from which it originally was discovered. Experiments with children ranging in age from three to seven years demonstrated their ability to discover a principle in one problem situation and transfer it to comparable problems. In

one of the studies, six toy airplanes were placed behind as many doors in a toy hangar. The airplanes were all of one color, but each door was different in color. When the child pulled the door which matched the airplane in color, it opened and he secured the toy. Most of the children discovered this principle, and were able to apply it when the situation was changed so that each of the airplanes was a different color and the doors were the same color, and also when both airplanes and doors varied in color but one toy corresponded to one door. Form matching and size matching series also revealed the same sort of intelligent behavior. Furthermore, some of the children were able to carry the principle discovered in the first series over to the other two series, which were rather unlike situations.⁹

Insightful Learning in Arithmetic. The psychology of arithmetic provides many illustrations of the way in which pupils deal with new situations by using meaningful principles. The child who counts to find the answer to a simple number combination, or who uses other devious methods of solution, does so in an effort to find meaning in the situation. (And the evidence indicates that he will use such methods in some concealed fashion even if the teacher tries to prohibit them and insists that he just "memorize" the "number fact" by repeating it over and over again without any effort to rationalize it.) When a child solves 24 plus 24 by saying "25 and 25 are 50, less 2 is 48," he is making an intelligent use of his previous learning. Many textbooks have taught three cases of percentage corresponding to these situations: What is 10 per cent of 100? What per cent of 100 is 10? Ten is 10 per cent of what number? If the pupil really understands the underlying number relationships in percentage, he will be able to handle specific problems whether they occur in one "case" or the other.

Recent trends in the theory of learning, together with new experimental evidence, have begun to change methods of teaching arithmetic radically. Much instruction in arithmetic has proceeded on the assumption that time spent in understanding arithmetical processes is wasteful, and that the procedures might better just be memorized. How influential this

doctrine has been is shown by a very recent admonition that "it might be more economical first to teach the child to memorize the combinations and later develop the number concepts." However, the evidence is beginning to run in a diametrically opposite direction. Brownell has reported evidence that habituation (memorization) of the number facts does not occur until the child has found meaning for them.¹⁰ In another investigation, one large group of second-grade children learned the addition and subtraction combinations by procedures that emphasized finding the answers for themselves, grouping the combinations to show relationships, and understanding general principles, such as the rationale of the zero-combinations. A comparable group were always told the answers, never permitted to discover them for themselves. The combinations were always practiced in mixed order, and large amounts of specific drill were administered. The experiment lasted approximately eight months. During this period three tests of transfer of learning to untaught processes were administered, and a fourth was included in the final test battery. The differences on all four tests consistently favored the group that had used meaningful procedures.¹¹

A still more recent experiment compared the learning of the 100 addition facts by the methods of specific repetition and meaningful generalization. When given a transfer test composed of thirty addition examples, each of which contained one addend larger than ten, the pupils who had used the method of meaningful generalization were markedly superior to those who had learned by sheer repetition of the specific facts. The author of the investigation concluded that his evidence supported "the faith of those who would make arithmetic less a challenge to the pupil's memory and more a challenge to his intelligence."¹²

There may be some things that we have to learn almost by rote. But the school should hold such tasks to the absolute minimum and place its emphasis upon rational learning. Education should call for the exercise of intelligence. Instruction should lead the child to understand. Insight should accompany

practice. The school must encourage active discovery rather than sheer memorization of answers passed out by the teacher or the textbook. Learning activities should culminate not only in "specific facts" but especially in meaningful generalizations which can be applied to a large number of appropriate particular situations. For example, common fractions, decimal fractions, and percentage should be taught not as independent processes which can be manipulated by certain rules that govern the manner in which they can be changed back and forth, but as different expressions of the same idea. Educational methods must emphasize the organization of responses into highly coherent systems of ideas and smoothly coordinated acts.

ORGANIZATION IN LEARNING

Learning is a Change in Behavioral Organization. It is important to remember that it is the organism as a whole which learns. When the individual learns new patterns of behavior as a means of attaining his goals, he changes as a *person*. Learning is not the acquisition of items of information or skill, or of a multitude of discrete reactions, but is a change in the *organization* of behavior which gives the organism more effective control over the conditions of experience. One of the most important corollaries of this principle is the fact that different "kinds" of learning take place concomitantly. Bode has recently explained how thinking, appreciation, skill, and information, for example, are interrelated in learning activities:

Thinking has to do with the removal of obstacles, and this involves an element of concern or value; else why take the trouble to think at all? The successful culmination of thinking has an attendant esthetic quality, as when we speak in mathematics of a "beautiful demonstration." Thinking, moreover, involves the gathering of data for the testing of hypotheses, which in turn is related both to the acquisition of information and to the development of skills or techniques in observation, in analysis, and in the organization of material. . . . Learning as reconstruction combines thinking, skill, information, and appreciation in a single unitary process, and

it is characterized by flexibility, since it must constantly adapt itself to the circumstances of the situation.¹³

Interrelatedness of Learning Products. Many other illustrations of the interrelationships of learning outcomes can be found. As the child learns arithmetic he may be acquiring self-dependence or learning the habit of leaning on others. The classroom may smother interests or stimulate new and enriching ones. The recitation may stimulate rigorous thinking or encourage the expression of half-baked ideas. School experience may promote self-confidence or foster timidity and inferiority. The whole of the child's school life may give him a warm sense of personal worth or deflate his ego. Teachers should remember that they are always dealing with the pupil as a person, never with just a piece of him at a time.

DIFFERENTIATION AND INTEGRATION

Learning as Differentiation. The situations to which we respond are almost always a complex of stimuli. In adjusting to such situations, it is frequently not sufficient to perceive only their gross characteristics. Therefore learning often involves the process of noting details in a situation which has previously been experienced in its more general form or outline. This is the process of *differentiation*. When one approaches a city from a distance for instance, he usually sees the sky line as a relatively undifferentiated whole—he perceives its general outline but is unable to distinguish the forms of specific buildings. As he comes nearer, however, and observes carefully, the outlines of particular buildings begin to appear and are seen as objects against the background of the scene as a whole. The phenomenon of differentiation of specific details is also evident in the way the child acquires number concepts. Contrary to popular assumptions, the number idea does not begin with counting. The child's first differentiation of a group of objects meaning *many* is not into a series of ones, but into more or less unequal subgroups. The child does not need to count to comprehend the meaning of *more* or *less*. The idea of *equal* is

somewhat more difficult but can also be grasped without counting. The cardinal (quantity) and ordinal (series) concepts of number emerge together. Counting accompanies this process as a relatively *late* process of differentiation.¹⁴

Differentiation a Highly Important Process. Responding to wholes only, without distinguishing details and their relations, has very limited value in experience. In learning to read, for instance, some words may be distinguished from one another by their general outlines. This form of recognition has limited usefulness, however, for different words may have essentially similar configurations. Discrimination, therefore, depends upon noting the detailed characteristics and differences in words.

Necessities of adjustment determine the extent to which differentiation occurs. The necessity for directing energy upon specific objects, or at specific points—hitting a golf ball, for example—causes a narrowing and specificity of response. Likewise, certain aspects of the stimulus field, rather than the original whole, are sorted out as the critical occasions for the response. Differentiation occurs, therefore, both in perceiving the situation and in reacting to it.

Discrimination of the particular or salient features of a complex situation makes possible a learning process which makes for great economy in human behavior, namely, *cue reduction*. Cue reduction has occurred when a particular aspect of a complex situation is sufficient to evoke a response originally made to the situation as a whole. We are constantly reacting on the basis of reduced cues. We learn to judge a friend's mood by the sound of his voice, or the sound of his footsteps, without seeing his face or his gestures. We recognize different trains by the sounds of their whistles. In rapid reading we often do not see all the letters of a word, but recognize what is there by the part actually perceived. Sometimes we do not even see all the words as we read. In the early stages of memorizing a musical performance, the player may attend to the next notes at about the time the sense organs in his muscles pick up stimuli from

his muscular responses to the previous notes. Ultimately, the movement-produced stimuli are sufficient to evoke the next response, and so he can play the exercise without watching the notes or even thinking about the movements involved.

Learning as Integration. Learning, of course, is more than a process of differentiation or of moving from whole to part. It is also a process of building up, of putting parts together in new relations to form new wholes. This is the process of *integration* and reorganization. So details may emerge from larger wholes and ultimately acquire such a degree of individuality or specificity that they may be combined with other particulars and reorganized into a new pattern. Many of our acts of skill involve the utilization of responses that have already been formed in other contexts. The growth of concepts or ideas, though often necessitating a reduction in the number of particulars to which a class name applies, in other instances involves the inclusion of additional concrete items under a given verbal symbol. Integration, or reorganization of experience, occurs when we discover the relations among things that we have originally learned at different times and in different contexts. For example, we may extend and enrich our knowledge of human behavior by relevant information from many subjects—psychology, biology, social science, and literature, to mention only a few sources. Educational procedures should stimulate and facilitate one's ability to systematize, to integrate or unify the multitude of things which he learns. Purposive educational experiences which call for problem solving are the ones which are most likely to evoke the continuous utilization and progressive reorganization of previous learnings.

Integration Not a Process of Summing. It is important to understand that an integrated whole possesses an *organization* which gives it a character which is more than, or, perhaps, different from, the mere sum of its parts. When acts or ideas are combined in a new way, the parts lose something of their individuality in becoming the members of a new pattern of behavior. In other words, it is not the part itself that is most

important, but the relations it has with the other members. An understanding of modern economic problems, for example, involves a clear recognition of the interdependence of agricultural, labor, and industrial policies.

Differentiation and Integration are Correlative Processes. Differentiation and integration are not independent processes; both phases of growth contribute in interrelated fashion in the development of behavior. Both processes, furthermore, operate throughout the individual's history. Even the mature individual frequently reacts first to the generalized characteristics of situations and then discriminates their more specific phases. For example, he may not notice for some time that there is a difference in number and arrangement of needles on the pine trees around his summer cottage. Then, when he has noted these details, he may combine them with other characteristics such as the nature of the bark as a means of distinguishing one kind of pine from another.

Organization Determines Association. During investigations of integrative forms of learning, Thorndike found that mere proximity in space or time was insufficient to explain in most cases how things became related. He decided that some sort of "belonging" or "fitness" was necessary for a complete explanation of learning. He pointed out that unless the individual senses that there is some relation between two situations, he may experience them in sequence repeatedly without forming any association between them. It has been suggested that this "belonging" arises when two or more events are members of some more inclusive scheme or pattern, and that the relations among these situations are determined by the larger whole. For example, in the series, 2, 4, 6, 8, 10, the association between 4 and 6 is dependent upon the scheme or principle with which the series is constructed. This belonging is obviously not due to the mere fact that the one number follows the other, but is a product of the intrinsic relationships among the numbers. It is in this sense that it has been said that association is a product of organization. Situations get their belonging from their membership in a coherent pattern of events or behavior.

THE IMPORTANCE OF RELATIONSHIPS

Relatedness has become the central concept in the psychology of learning. We have already emphasized that meaningful learning in arithmetic, for example, makes it possible for children to understand our decimal number system and the ways of manipulating it. This system provides the basic pattern for understanding and relating the multitude of specific items which are included in it and controlled by it. The decimal nature of the number system is the basis for an understanding of the idea of place value, and the means of changing ones to tens, tens to hundreds, or hundreds to tens, tens to ones, and so forth. This scheme is the basis for understanding the processes of addition and subtraction, as well as other operations. It is probable that many of the errors that children make in arithmetic are due to the fact that "skills" have been taught as specific and discrete elements rather than as related processes, and learned as mechanical operations rather than as understandable and logical aspects of systematic mathematical thinking.

Likewise, it is possible to teach and learn history as a collection of specific facts, or to organize events into meaningful patterns and developments. For instance, one can treat the New Deal as a series of relatively isolated events in our history, or as another episode in the clash of interest groups which has been taking place since the beginning of our national life. It is by placing specific items in a broader pattern of relationships that we invest them with meaning.

The teacher can be helpful in pointing out significant relationships that students might otherwise not see. Courses can contribute to an understanding of relationships by being built around meaningful problems and by emphasizing systematic organization of ideas. But the most important educational purpose is to stimulate *students* to discover relationships, to organize ideas, and to bring experience from many sources to bear on new problems. It is essential to remember that "organisms actively *create* mental unification in themselves; they

do not simply absorb such a condition as a completed product." ¹⁵

SUMMARY

Learning situations vary greatly in the amount of discovery of the correct response which is necessary for solution and also in the difficulty with which the appropriate reactions are organized into a smooth-working pattern. Relatively easy problems which are well within the learner's experience may be solved very quickly. The essential relationships in the situation can be perceived easily, and the appropriate behavior can be organized directly and effectively to conform to the structure of the task.

In other instances, however, the task may be much more complicated, so that a great many trials may be necessary before the situation is thoroughly comprehended and the proper responses discovered. These successive trials, or attempts at solution, are not purely random, however, even in very difficult situations. The individual's first efforts are guided by his preliminary inspection of the task, even though it is not very clearly perceived at that moment. This perception of the nature of the situation, even though incomplete, is usually sufficient to evoke somewhat relevant reactions which are within the learner's repertoire of experience. The early trials in a complex situation often serve an exploratory function. They aid in seeing the goal more clearly and explicitly and in getting some notion of the means which may be necessary to attain it. This increased knowledge of the goal in turn tends to make the attempts to reach it more and more successful, until, finally, the diffuse behavior and the errors which characterized the early trials drop out and give way to the appropriate responses which are organized in such fashion that the performance is done directly and efficiently. This process of progressive approximation to the final successful response pattern has been described as that of "trying this or that lead to the goal," or of discovering the right path to the objective. It has

also been aptly characterized as learning by "approximation and correction."¹⁶

The process of approximation and correction is that of evaluating each attempt at performance or solution by gauging the success of the response in relation to the objective, and by adapting the next trial in the light of this appraisal. In other words, the learning process is characterized by the discovery and utilization of means-end relations.

Behavior is modified by its consequences. This means, essentially, that responses which do nothing to further the progress of the learner toward his objective or actually impede his attainment tend to be eliminated, and those which are instrumental in achieving his goal are selected and learned. Learning will be effective, therefore, to the extent to which the individual perceives the essential means-end relations. The comprehension of means-end relations is often called insight.

Insight frequently takes the form of "hindsight" rather than "foresight." That is, although the learner may devise the means of attaining his goal by direct invention of relevant activities, progress most often occurs, probably, by observing the usefulness of an act—its relation to the goal—after it has happened. This is one reason why a varied and persistent attack upon a problem is essential. Such a range of trials gives greater opportunity for a possibly fruitful response to occur and to be recognized.

If insight means a complete solution of a problem—a comprehension of the essential relationships in the situation as a whole—it is clear that it may occur suddenly in a relatively simple task, or wait upon a systematic exploration which may be necessary to throw the essential features of the situation into bold relief, or be attained very gradually in a complex problem. But even when the principle of a problem has been discovered, the attainment of precision, the stabilization of the correct solution, may have to be secured by a considerable amount of further practice.

The comprehension of a situation as a means of attaining

control over it takes place in two interrelated ways. One of these is the process of differentiation, in which the details or specific features of a more general or comprehensive pattern take form. These particular aspects of experience emerge under the control of the larger wholes of which they are members. The significance that any one thing has by virtue of its relationships should not be obscured. Nevertheless, these specific characteristics may attain such a degree of individuality that they may be removed from their original setting and combined with other particulars to form a new behavior pattern. This is known as integration, which is the second way in which the reorganization of behavior occurs. Differentiation and integration are not independent processes. Both are involved in most of our learning activities.

The most significant feature of learning behavior is organization. An act of skill, as we shall see in the next chapter, is a highly integrated performance, in which no one component acts independently but must fit neatly into the entire pattern of movement. Likewise, the most important thing about ideas is their interdependence. The uses and the consequences of ideas, for example, are among their most important relationships. Associations among experiences are determined by the patterns in which these experiences occurred or by the new relationships into which they may be reorganized.

In the light of the discussions in this chapter and the one preceding, the following concise outline of the learning process, based on an analysis of a large number of experiments, should now be understandable:¹⁷

1. The subject must be motivated.
2. A field or complication of motives exists.
3. Obstruction is offered to the principal motive.
4. Hyperactivity is aroused.
5. The response is multiple and varied.
6. The response is to relations of stimuli.
7. The most important relation is between means and objective.
8. Selection or least action appears.

9. The selected responses originally occur fortuitously.
10. The effects of responses are crucial.
11. The rate of learning varies in degree from gradual to abrupt.

From a rapidly growing volume of research on human learning, an increasing amount of it done with children under normal school conditions, the broad features of a constructive view of learning for the school, sharply set off from practices which relied upon formal drill, are taking form. This point of view emphasizes relatedness. It stresses meaningful generalization. It considers understanding as a necessary accompaniment of practice. It looks upon learning as a developmental process, not one of fixation of stereotyped reactions. It encourages discovery and problem solving instead of rote learning and parrotlike repetition.

QUESTIONS AND EXERCISES

1. In what ways does rote learning in a laboratory situation differ from the learning children are required to do in a social studies project?
2. Give an example of "trial-and-error" behavior from your own recent experience—possibly the search for a lost article. List each step of your search. To what extent were your activities random? Were some more relevant to the situation than others? Which ones? Compare the phases of your search with those practiced by the usual six-year-old.
3. In the outline of the learning process there was listed a stage entitled "selection or least action appears." How do you interpret this?
4. Give an example from your own experience or from that of a friend of the correction of a habitually incorrect grammatical expression in everyday speech. How did you first recognize your bad habit? Did you realize it violated a grammatical law? Describe each step in your improvement. At what age do you think self-correction by grammatical rule is possible?
5. A college student in a required laboratory science course said to the professor, "I can't do any of the arithmetic in my experiments because I went to a progressive school." Interpret this

situation in the light of the quotation from John Dewey in this chapter. What solution do you offer?

6. It has been said that thinking or learning occurs only when the individual encounters an obstacle. Can you develop this notion more fully? What implication does this have for the role of motivation?
7. Give instances of teaching children in school or at home in which the law of effect is ineffectively used or neglected or cases in which bad impulses are actually rewarded.
8. Under what circumstances may events be experienced simultaneously without resulting in associative learning? The following are two examples: Noting the names of various vessels in the U. S. Navy, and seeing the "tailing-off" design on top of chocolate cream candy. Give another example. Show how "belongingness" may develop in the above situations.
9. Cite one case in which the immediate "affective concomitants" may be unpleasant, but the law of effect operates because of the "functional consequences."
10. Describe three instances in which children's learning was facilitated by "insight." Did the "insight" emerge suddenly or gradually? Explain.
11. Defend or criticize this statement: "The law of effect is the most important law of learning."
12. Give an example of learning in which the process is predominantly differentiation. Give an example of learning in which the process is predominantly integration.
13. Is it possible for an irrelevant feature to become associated with a successful response and thereafter always function with that response in the course of learning? Cite an instance.
14. There is an amusing map, "The New Yorker's Idea of the United States," in which New York (especially New York City) occupies about a quarter of the total geographical area and all southern waterways are labeled "Swanee River." What process of learning, as described in this chapter, will have to take place before Mr. New Yorker will have a more accurate notion of the country? Suggest the necessary course of such learning.
15. In what ways would it help you in teaching junior high school pupils to know about the law of effect? How would you apply the principle?

16. What knowledge do you think it may always be necessary for children to acquire by rote learning?
17. Write two essay questions on the material of this chapter which would serve as an aid to further learning as questions for the final examination.
18. Make a diagram to show the essential features of a learning situation in which a means to a goal is to be selected. Name several situations which your diagram might represent.

CHAPTER XI



PRINCIPLES OF GUIDANCE IN LEARNING—I

An outline of the general nature of learning to which the two preceding chapters were devoted, is sufficient to emphasize the fact that successive efforts to learn may vary greatly in their effectiveness. There are important principles of economy related to such special factors as the selective and directive effect of motives, particularly the influence of clearly perceived goals, the discernment of means-end relations, and the meaningful organization of experience. By controlling motivation, by aiding the learner to evaluate his trials, by applying rewards and punishments judiciously, by arranging the length and distribution of practice periods in optimum fashion, by assisting the learner to adopt a scheme of organization, by giving instruction concerning useful methods of procedure, and by other types of supervision, it is possible to guide the individual's efforts toward successful results. Moreover, by making the student aware of efficient methods of learning, one gives him the means of managing his learning independently. This chapter and the one following will be devoted to the principles of guiding and managing learning successfully.

The principles of economy will be discussed with reference to two phases of learning:

1. The acquisition of skill.
2. The acquisition of powers which depend primarily upon verbal abilities or other symbolic processes.

This division is made merely for convenience in discussion. These two phases of learning are often closely interrelated. For example, in learning to read one must take care of the formation of proper motor reactions which are highly com-

plex habits of eye control; and of the acquisition of ideas, that is, of comprehension or thought-getting. Furthermore, the principles of efficiency are essentially the same for both motor and ideational learning. This fact of fundamental unity within the learning process will become apparent as the problems of guidance are treated.

PRINCIPLES OF GUIDANCE IN THE ACQUISITION OF SKILL

Evidence That Guidance Is Desirable. We need only to point to the "hunt-and-peck" methods of typewriting, the pointing-with-the-finger habit in reading, the cramped grip in writing, or the "dog-paddle" strokes in swimming to convince most people of the inadequacies of unguided learning. By teaching and guiding the learner to acquire the "touch system" in typing, regular eye movements in reading, the positions and functions of the fingers in writing, or the "crawl" stroke in swimming, much higher proficiency is achieved. The learner left to himself usually adopts the first method he stumbles upon, a method that is rarely good. The effective methods often are more difficult in the early stages. Immediate returns are often meager, and, in general, the unguided learner seeks immediate progress; he follows the line of least resistance. Not only, then, is it the business of the instructor to know *what* the child should learn but also *how* he should learn.

Many experiments have shown the value of guidance in learning. One of the more recent ones dealt with improvement in archery. One group of students was given regular and systematic instruction, including preliminary directions and explanations before they shot the first arrows. Another group practiced under the experimenter's observation but without any instruction.

The subjects given tuition began with a higher score than the uninstructed ones, and maintained their superiority throughout the experiment. The instructed group progressed at a faster rate during all stages of the learning. The experimenter concluded that in giving guidance, the instructor can aid the learner in the following ways:

1. He directs the learner's attention to more adequate techniques than those that the learner has been employing.
2. He thus stimulates the learner to break up faulty techniques, even at the temporary loss of achievement. In teaching a complex skill, this process is repeated again and again.
3. The teacher promotes the growth of intellectual insight on the part of the learner into the facts related to his success. The instructions given by the teacher make a major contribution to the improvement of the learner's conception of the skill that he is attempting to master.
4. Finally, the teacher's attitudes and encouragement serve to give the learner a feeling of security and confidence in giving up a familiar mode of behavior and seeking one that is better.¹

The significance of these aids will become more apparent with a fuller discussion of methods of guidance.

Know the Character of Effective Performance. The first requirement of an instructor, or of a person managing his own learning, is to know the character of the good performance. To determine this is often difficult and may be done only by extensive research.

The way in which modern methods of teaching reading grew out of experimental investigations is a good illustration. Three discoveries made at different times between 1879 and 1910 are the fundamental, but not the only, bases upon which modern methods rest. One was the discovery that the eye, in reading, moves along the line by a series of starts and stops; the second, that the eye while at rest can take in briefly about an inch and a half of a line of print held at the ordinary reading distance; and the third, that one need not see distinctly all of the letters, or even all of the words, in an "eye-ful" to recognize the group of words. These discoveries led to new methods in which were emphasized learning to recognize words as total configurations instead of letter by letter, learning to read by getting meaning directly from perception of the symbols without the intervention of oral reading or complete articulation of the words, and learning to utilize rapid and

rhythmic eye-movement progressions along the line. Shifting from the old to the newer procedures has enabled both young and mature readers to improve the thoroughness of comprehension and to increase greatly the rate of reading.

The psychology of reading also provides an illustration of learning activities in which the motor and ideational phases are closely interrelated. In the early stages of learning to read, it is essential for the child to develop the habit of working systematically from left to right in reading lines of printed words, and in dealing with new words, to acquire the habit of studying them from left to right, "jumping quickly back to the beginning of the word, and progressing across it" from left to right.² Failure to acquire these systematic habits of dextral progression may cause difficulty in learning to read. Looking at a word from right to left, for example, may cause reversals, such as the reading of "was" for "saw." It is important, therefore, for the teacher to guide the development of correct eye movements from the beginning of reading instruction. Once these basic motor or procedural adaptations have been established, however, eye movements may best be interpreted not as causes, but as symptoms, of reading ability or disability. In other words, at later stages of learning, eye movements serve to reflect efficient or poor performance in reading. Recent interpretations of the nature of reading refer to eye movements as "peripheral measures" of reading efficiency, the most important phase of which is comprehension, a "central ability or function." Thus, the thought processes of reading tend to determine the motor phases of the activity.³

The combined arm-and-hand movement method in handwriting, the "touch" system in typewriting, the "crawl" stroke in swimming, are other results of investigations, either crude or refined, of the relative merit of different types of performances. While much remains to be learned concerning different methods even in the simpler school skills, such as writing and drawing, a teacher of these subjects should at least have the available information about the relative merits of different types of performance.

The Observation of Performances and Models. Having ascertained the nature of effective performance, how is it to be learned? We have already described learning as a series of progressive approximations to some standard or criterion of successful performance. The first principle of guidance, therefore, is to make certain that the learner has a clear understanding of the goal. It is the goal which determines the organization of the performance as a whole. As learning proceeds, the goal and the means of attaining it become more explicit. This developing insight into the nature of the task provides the basis for a corresponding improvement in the precision with which the act is executed.

One of the most effective means of aiding the learner to perceive the goal clearly is to take advantage of the human capacity to profit by observation of a performance or model. Choice here is determined entirely by the clearness with which the performance or the model illustrates what is to be done and how it is to be done. Despite the large number of functions in which learning is more or less guided by our observations of others in action, most of the motor activities in common skills are exceedingly difficult to perceive. Inasmuch as he does not always know just what to look for or where or how to look, the learner often profits little by observing an expert typist, tennis player, golfer, or singer. The child especially finds difficulty in seeing how the teacher writes, dances, or ties a knot. To referee—that is, to observe skillfully—a boxing contest or wrestling match, to umpire a baseball game, or judge a diving or dancing contest is a fine art requiring years of experience. Were finer movements not difficult to perceive, the sleight-of-hand performer would have failed long ago. Learning by observation is difficult. It is brought about in no mysterious, instinctive, or intuitive way; it is effective only insofar as the learner is able to perceive what the desirable reactions are and is then able to guide his efforts accordingly.

The skillful instructor should be a good actor, able to single out a particular movement and perform it alone when necessary, and able to slow up a movement to afford more deliberate

observation. The use of charts and animated diagrams, mechanical devices, and slow-motion pictures often make clear the pattern and details of a performance more adequately than the observation of the original. The essential criterion for the choice of a model for purposes of guidance is the faithfulness and clearness with which it displays the ends sought. Other things being equal, that model is best which makes the desired reactions most intelligible and provides the most effective means of discovering relationships and of distinguishing errors and successes.

Manual Guidance. In addition to the observation of movements and models, another form of tuition that has attained popularity from time to time consists in putting the learner mechanically through the performance or at least in providing some mechanical guide which enables him easily to put himself through. In writing, for example, this might be done by guiding the child's hand through the letter movements or by providing letters grooved in wood or metal through which the child pushes his pencil, or by allowing him to follow with his finger the sandpaper outlines of letters, or to trace on tissue paper the forms of letters visible through it. There are two ways in which putting the learner through the reaction or mechanically guiding his progress might conceivably be of value:

1. By providing a clear idea of what is to be done.
2. By giving the mechanisms involved artificial exercise in the way they should function.

At first thought this device would appear to provide a simple way of eliminating errors and circumventing the usual "trial-and-error" behavior.

Some Studies of Manual Guidance in Learning to Write. What seemed theoretically to be the best of these devices, the tracing of letters on tissue paper placed over letter forms that were clearly visible through the paper, has been tested experimentally (Gates and Taylor).⁴ Two squads of children with about equal intelligence and motor ability but without previ-

ous experience in writing were selected. One squad practiced daily the tracing as described, while the other practiced actual writing, using a model placed above the writing page. After about a month of daily practice on ten different letters, both groups were tested for several days in real writing, using only the model as guide. Some were almost completely baffled. They were familiar with the shapes of the letters, knew at what points to start and in what direction to proceed, but for them writing a letter on a blank page was a very different performance from tracing a form which showed itself through a thin paper. Some of them simply could not produce a legible letter; their consternation and chagrin were pathetic. Apparently, even though a person may know what product he wishes to produce, most of his efforts may lead astray.

Direct practice in writing, in this experiment, was more effective than tracing. Likewise, in a study (by O. E. Hertzberg)⁵ it was found that direct practice was more effective than putting the child through the reactions by means of mechanical guides. Knowledge of what to do, where to start, etc., was obtained better by direct writing.

A survey of investigations in manual guidance shows that the results are by no means consistent. In certain studies, the beneficial effects of guidance were not equal to those from the same number of unguided trials. In other instances, however, manual assistance was definitely beneficial when the criteria were number of trials necessary for learning and the number of errors made during the process. One of the most important investigations was conducted to determine the relative efficacy of free and manually guided maze learning when equated in terms of time. The results favored guided learning, particularly when retention was measured.⁶ In instances where guidance proved effective, it was interpolated early in the practice series or given initially.

Manual guidance is likely to be effective only when it aids the learner to get the "feel" of the act as a whole—not in some artificial form or setting, but in terms of a realistic performance. It is this "feeling" which constitutes the basic organiza-

tion, or schema, of the activity, within which refinement of the movements will occur as the specific phases of the performance become more nicely fitted into their proper relations. Giving guidance in the early stages of learning aids in the establishment of the initially integrated response which is essential for the economical acquisition of skilled movements.

Learning the Act as a Whole. There is a popular conception that an act of skill should be analyzed into its elements and part movements, and that each of these segments should be learned singly. For example, in swimming, the learner may grasp the edge of the tank and practice singly some part or the whole of the leg movement; in singing, he may repeatedly do certain limited exercises; in athletics, "formal" setting-up exercises may be extensively used; in writing, many methods have elaborate systems of particular exercises such as repeated making of up and down marks, ovals and reverse ovals, swings, and loops. The theoretical basis of such formal exercises is the notion that to master the whole one must master the parts, that if one learns to do singly all of the elemental acts in a complex function, putting the single acts together will be relatively easy.


This theory is quite erroneous. Learning to do the parts singly is by no means learning to do the whole. The greatest difficulties are often encountered in putting the elements together. Moreover the elements are often already sufficiently developed without the preliminary practice; *if not, they are usually more economically perfected in practicing the whole.* Those which do not develop sufficiently while practicing the whole may well be handled singly later, but not until it becomes necessary. We should not begin with *elaborate* formal exercise of the elements or make them a large part of the course of training but should utilize them as strictly preventive measures where difficulty is beginning to appear or as remedial measures where a particular defect or deficiency is apparent. When thus singled out for specific treatment, a particular aspect of a total performance has a significance and character it could not have as an isolated segment practiced without respect to its membership relations. In the case of very complex

tasks, it may be necessary to break the total performance into functional units, practicing each of these sections as a whole. Special attention will then have to be given to the integration of the "sub-wholes" into a working pattern.

The value of learning a thing as nearly as possible in the setting in which it is eventually to be done is illustrated in an experimental comparison of two methods of learning type-writing. One group was taught by the "comprehensive process of beginning and continuing the practice on complete composition material that is most like that which the typist will be required to use [in practical work]," and a comparable group used a "synthetic process of beginning with isolated and meaningless letter-symbol combinations and gradually going from these to the more simple words, phrases, and sentences, and finally to the use of the business letter and other composition forms." The group which used the comprehensive units was significantly superior in final score and average number of letters written per practice period.⁷

The organization of a skilled performance, of course, often involves the utilization, in new relationships, of previously acquired movements. But these so-called elements do not fit together in additive fashion to constitute the completed act. It is the *pattern* of these particulars which is the prepotent characteristic of their successful functioning.

Overemphasis on any one phase of an act usually destroys its balance and effectiveness. For example, if the golfer makes some change in his movements after the downswing of the drive has begun, the whole performance is distorted and the stroke goes wrong. A change in any part causes a change in the act as a whole. In an act of skill, as in any other complex aspect of behavior, the most significant characteristic is that of organization. The whole determines the nature of the parts. Once the fundamental pattern of action is established, the parts or specific movements tend to fit together in proper relation. A shift in organization forces a corresponding readjustment in the details of performance. The prepotence of organization in skill is suggested by such terms as "rhythm,"



"timing," and "feel of the act." In playing golf, if the "feel" of a stroke is right, one expects the ball to go according to plan. If the "feel" is wrong, one knows before he looks after the ball that he has muffed the shot.



ESSENTIALS FOR CONTINUED IMPROVEMENT OF SKILL

Flexibility in Skilled Performance. Skill must not be confused with a stereotyped or inflexible reaction pattern. No one performs an act of skill twice in exactly the same fashion. With subtle changes in the situation, there must be corresponding adjustments in the pattern of responses necessary to reach the goal. One adjusts his writing movements to the height and size of the desk. The golfer must adapt his strokes to the thickness of the turf, to the contour of the ground where the ball lies, to the depth to which the ball has burrowed into the sand trap, to the nature of the hazard, and to a thousand other changing conditions of the game. The runner compensates for the condition of the track. The singer adjusts his technique to the meaning of each composition. Because of the inevitable necessity of compensation, it would be unwise to have the learner practice always under exactly the same conditions requiring invariable movements. The cues to successful performance under varying conditions are an explicit perception of the goal and the intelligent adaptation of means to end.

Discovery of Correct and Incorrect Responses. Since learning proceeds through the identification and utilization of means-end relations one of the most important guidance techniques is assisting the learner to determine the consequences, or the appropriateness or inappropriateness, of his reactions. While the emphasis should be on correct responses, devices which help the identification and elimination of errors, unless they introduce other inappropriate reactions equally bad, are much to be desired. In the subtle elements of writing, speech, reading, tennis, and other skills, the instructor has the double duty of being constantly on the alert for errors, usual and unusual, and of instructing the learner in the ways of detecting and eliminating his own inappropriate acts. Prevention is, of

course, better than cure. Prevention may be secured to a considerable extent by giving very diligent attention to the initial stages of learning. In studies of children's first lessons in reading, it was found by (Meek)⁸ that inappropriate methods of attack, hit upon in the first endeavor to learn, may be so persistent as to make later progress difficult and the work distasteful. Such difficulties may mark the beginning of "disabilities" in reading. The cases of "disability"—children who are persistently very backward and experience extreme difficulty in learning—may be brought back to efficiency only by ingenious or extreme measures later. The procedure for treating such cases comprises the following essential steps:

1. Diagnosing the particular defects or deficiency responsible for the trouble. This is often an intricate task, demanding considerable insight into the particular skill as well as an understanding of human nature.
2. Making clear to the learner the sources of the trouble.
3. By encouragement or other devices arousing a strong desire to overcome the difficulties and to achieve normal ability.
4. Providing remedial exercises designed specifically to supplant the inappropriate reactions by effective ones.

Although it is important to detect and eliminate inefficient or incorrect responses, it is even more essential to disclose the correct reactions and reveal their relations to other phases of the performance and to the goal. Above almost everything else, knowledge that progress in the right direction is being made is a stimulant to further successes. In this work, as indeed at all stages of learning, the instructor or coach should constantly be on the alert for the recurrence of old or the appearance of new errors. They should be detected before they become fixed, and the proper response suggested. When an error is once eliminated, it should not be mentioned again. Emphasis should, then, in general be placed on the correct reaction.

The learner himself should be trained to detect his errors and successes. It is quite clear in observations even of adults in laboratory studies that most students are unnecessarily poor learners, unnecessarily blind to their errors and successes. These

deficiencies are due partly to the scant attention usually given to methods of learning. With a little attention to technique, most of us can become more systematic and more alert to our own reactions, and thus increase appreciably our ability to learn in each line. In learning to make public addresses, sing, etc., the recording of the voice, which is later critically studied, usually aids greatly the process of learning. In other types of learning, photographic and other records may be fruitfully used.

Precision. Progressive change in performance characterizes the acquisition of skill. The final proficiency is not merely the performance at the beginning done more rapidly; it is a different performance. Behind the gradual decrease in time necessary to execute the act and in number of errors made, other significant changes are occurring. There is a reduction in the muscular tension which frequently accompanies initial trials. There is elimination of surplus movements. Better preliminary orientation is attained as practice continues. With awareness of progress, greater interest in improvement may intensify effort, a more favorable attitude toward the task may develop, and greater self-confidence may be aroused. Greater insight into the task usually emerges, which leads to greater ability to identify true sources of improvement. Finally, at later stages in practice, the pattern as a whole tends to become much more clean-cut, and, through attention to relevant details, the performance takes on much greater refinement or precision.⁹ Precision is thus a relatively late development in the acquisition of skill. It takes the form of greater smoothness, economy, stability, rhythm, speed, and exactness. These refinements take place under the control of the basic schema or pattern which is the objective of the earlier stages of practice.

It is relevant at this point to call attention to the tremendous amount of practice which is necessary to attain proficiency in a highly complicated skill. Just any kind of practice, even in large amounts, of course, is not productive. In fact, under some conditions, practice may be actually detrimental. But there are principles of effective effort in acquiring skills,

and it is the purpose of this chapter and the next to outline these characteristics of economical learning. When practice is conducted under favorable and productive conditions, it still takes a great deal of it to develop the skills involved in playing basketball, or playing the piano, or singing. We should be very much surprised, probably, if we really determined how much practice a boy puts into basketball when he likes the game and wants to become proficient in it. (We should also be encouraged by the enthusiasm with which he practices when the end is really important to him.) The amount of practice which boys put into games is probably also much greater than that which they devote to skills that are a part of the school curriculum. Certainly it is much greater than that which is demanded by most learning experiments.

The revolt against formal drill, or sheer repetition, which has gained ground recently should not lead us to think that practice is unnecessary in learning. What it should influence us to do is to discover what forms of practice are fruitful and to guide the learner to make his successive efforts as efficient as possible.

THE VALUE OF VERBAL METHODS OF TUITION

Experimenters have studied the value of several types of verbal guidance in the acquisition of skill, including instruction on methods of work, calling attention to the significant aspects of the problem, stating the principle involved, and pointing out errors. Most of these investigations have shown that verbal guidance under certain conditions is beneficial. Some of the most important findings are as follows:

1. The value of guidance increases for a relatively short time with amount, and then decreases. The optimal amount is usually reached early in the learning process, after which additional guidance is detrimental both for learning and retention. Although these are experimental findings, they should be interpreted rather cautiously, since many investigations of the acquisition of skill have been made with relatively simple tasks, and the role of tuition might differ somewhat in more complex abilities.

2. Initial guidance is clearly superior in most of the experiments, with early interpolation the second most valuable position. Preventing errors before they have a chance to occur seems better than trying to eliminate them once they have been made.

3. Giving positive instruction is superior to calling attention to errors.

4. Too much guidance is probably detrimental if it reduces the learner's initiative and decreases his sense of personal responsibility for the performance.

Verbal guidance appears to be beneficial in motor learning where it enables the individual to attain insight into the nature of the task as a whole. It is often difficult, however, to express verbally the scheme or organization of an act of skill, and equally difficult to utilize a verbal exposition. The reasons are that those who wish to give guidance frequently have not verbalized their own motor performance as it was acquired, and that the learner also has little previous verbalized motor activity with which to assimilate instructions. We tend characteristically to depend upon the "feel" of an act experienced as an organic whole. It is usually difficult and perhaps unnecessary to describe complex motor performances in words.

✓ THE LEARNING CURVE

We have already emphasized the fact that final proficiency is different from the performance at the beginning merely done more rapidly. Important qualitative changes occur during practice. The quantitative changes which also take place can be observed from curves of learning, which give graphic representations of the amount, rate, and limit of improvement brought about by practice. The measure of success is plotted on the vertical line of the graph, and the amount of practice, such as number of trials or amount of time spent, is indicated on the horizontal axis. The curve of learning will fall if success is expressed in the number of errors per trial or amount of time necessary for each performance. (See Fig. 7.) The curve will rise, on the other hand, if improvement is expressed as the

amount accomplished per trial or in a given unit of time. (See Fig. 8.)

The Form of Learning Curves. The actual curves of learning, which are available in large numbers, are of various shapes. The forms are determined in part by the nature of the function itself and in part by the ability, methods of work, and

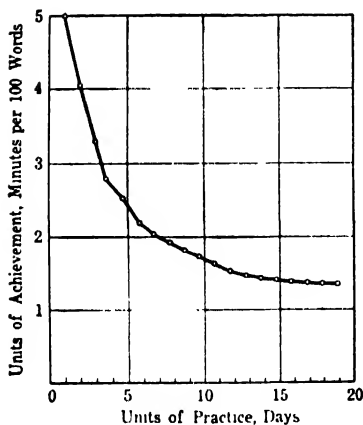


FIG. 7. PRACTICE CURVE OF TYPING

Reduction in time of performance with practice. (From Bills, *General Experimental Psychology*, Longmans Green & Co., 1931.)

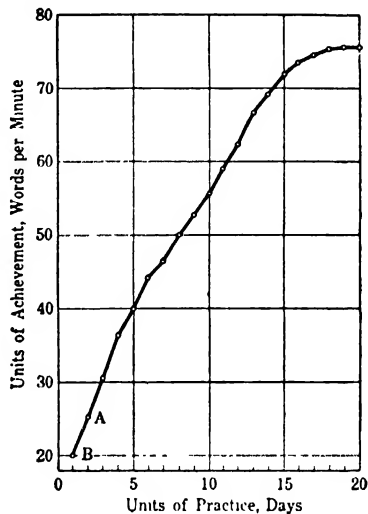


FIG. 8. PRACTICE CURVE OF TYPING

Increases in amount accomplished with practice. (From Bills, *General Experimental Psychology*, Longmans Green & Co., 1931.)

previous training of the individual learner and the circumstances under which he works. Furthermore, different methods of plotting the same results will affect the shape of the curve. There is thus no single or typical curve of improvement, but many different varieties of which a few representative samples are given in Figs. 7 to 9 inclusive.

Studies of learning curves will show that a rapid initial rise is a frequent but by no means universal characteristic. The actual increase in the output often rises rapidly in the earlier stages and usually more slowly at the final stages of an extended

experiment on the acquisition of skill. This does not necessarily mean that one is learning better in the early stages. The rapid initial rise may be due to such factors as these: (1) The utilization of previously acquired reactions which can be integrated fairly easily in service of the new goal; (2) the acquisition of the broad pattern of the new performance, the details of which are to be mastered later; (3) the organization of the task so that the easier phases of it are learned first; (4) the mastery of phases of the activity which make a great contribution to output as it is being measured; and (5) initial enthusiasm for the task. At later stages of practice, improvement becomes more difficult to attain; it develops through the refinement of smaller details of the act leading to greater precision, which, though important, usually does not cause a very great increase in measured output.

Curves characterized by a rapid initial improvement are negatively accelerated and convex in form. Positively accelerated, or concave, curves are also fairly common. They sometimes occur in acquisition of skill, as shown in the curve for ball tossing in Fig. 9. Slow initial improvement may be due to the early position of difficult phases of the task, to difficulty in constructing a general pattern of the performance, to the acquisition of responses which in themselves do not represent output as measured but which are the means of later more rapid improvement. Curves of learning informational or logical material such as content in history, psychology, or mathematics are often positively accelerated; the more one learns, the more easily he can learn the new material. Learning the basic vocabulary in the vernacular or in a foreign language makes progressive improvement in reading possible.

Positively accelerated curves are sometimes found with young children, or with subjects of inferior intelligence, when the improvement of older or more intelligent persons might take a different course.

The fact that the distribution of practice may influence the form of learning curves has been shown in studies of mirror drawing. The task was to trace a six-pointed star with the hand

covered but reflected in a mirror. If "series practice," or practice without rest intervals, was used in the beginning, improvement was slight, but when "recess practice" was employed the curve showed a rapid initial rise. At later points, where the development of speed and precision were the principal phases of improvement, series practice was effective.¹⁰

Most learning curves are abbreviated at both ends, as far as the entire course of actual improvement is concerned. The

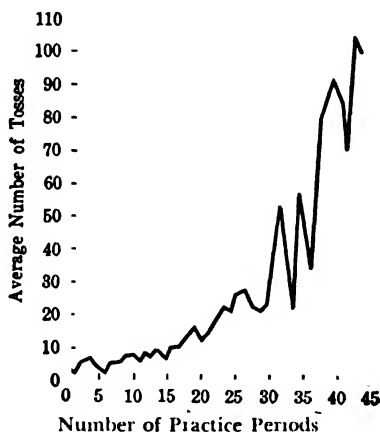


FIG. 9. IMPROVEMENT IN TOSSING AND CATCHING BALLS

The improvement is slow at the start but becomes more rapid as the subject becomes more proficient. Compare with Figs. 8 and 11. (Thorndike, *Educational Psychology*, Vol. II, Teachers College, 1913, after Swift.)

curve is probably never plotted from the absolute zero of performance, and the subjects in the experiments have not continued to practice until their limits of improvement were reached. If the entire curve in certain instances were determined, it might conceivably look like one of those in Fig. 10.

The Physiological Limit. In the case of such skills as typing and writing, an absolute limit of improvement is theoretically possible but practically almost never achieved. The physiologi-

cal limit is that degree of ability which a particular person cannot surpass because of absolute inherited limits in the speed or complexity of motor or mental response. In running a hundred yards, jumping, tapping with a pencil, or performing other functions which depend upon sheer speed and force of muscular contraction with relatively little opportunity for developing new technique, the limit may be reached. But in complex performances such as typing, drawing, playing the piano, carpentry, or surgery, it is very seldom reached. In acquiring information in any field—law, medicine, history—there is no physiological limit; there is always a possibility of learning more, although there is a limit to the speed with

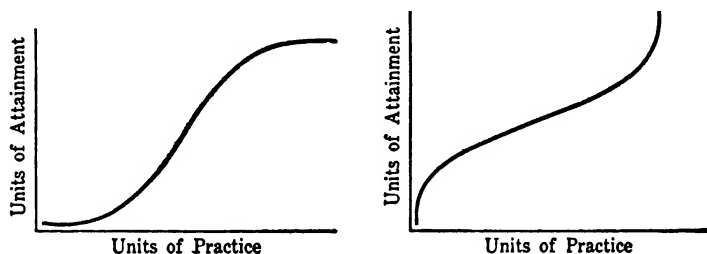


FIG. 10. POSSIBLE TYPES OF LEARNING CURVES WHICH MIGHT RESULT IF BOTH EARLY AND LATE STAGES IN LEARNING WERE STUDIED

which the items may be acquired. The limits which most persons actually reach are more likely to be "good enough" levels than real physiological limits. In most functions which have been steadily practiced for years, such as writing, reading, shaving, opening envelopes, tying neckties, sorting cards, memorizing, or studying, we are performing with a speed and efficiency far below our maximum possibilities. Under special incentives such as keen competition or bonuses in pay, typesetters, telegraph operators, and typists in industry, as well as readers, writers, or spellers in school, frequently rise abruptly from a dead level which has held them for years.

Plateaus in the Learning Curve. Plateaus, although not inevitable, may occur despite an interest in improvement and an effort to secure it. Sometimes they are due, unintentionally

but unhappily, to hitting upon a bad habit or method which interferes with further progress until it is eliminated. In writing, a pupil may develop an unfavorable sitting position or too firm a grip of the pencil; in reading, a habit of pausing too frequently in a line, or of giving too much attention to the minute details of words; habits which may inhibit progress until they are corrected either accidentally or after diagnosis and positive treatment. Plateaus may be caused occasionally by eye trouble, fatigue, and other physiological conditions, despite intentions to improve.

There are a great many other possible causes of plateaus, among which are the following: (1) undue attention to one part of the task, which disturbs coordination of responses; (2) shifting attention from one phase of performance to another—an emphasis on speed may affect improvement in accuracy adversely, and vice versa; (3) transfer of errors from one part of the activity to another; (4) lack of balance among different phases of a complex skill; (5) the persistence of ineffective methods of work; (6) failure to adopt a consistent method of practice; or (7) a change in method for the worse.¹¹

Several factors as yet insufficiently investigated are probably related to temporary or even extended cessation of improvement. One of these is inadequate "pacing," that is, too great gaps in the difficulty of a series of related activities. The learner finds the next steps beyond his level of insight, which forces him back on less intelligent and less well-directed methods, and may also seriously affect his attitude toward the task. More careful gradation of the work, so that all the essential steps in progressive mastery are laid out, would make continuous improvement more likely.

At times an apparent plateau actually masks an underlying process of development essential to further improvement. This is the case when lower order responses are fused or integrated into a new and more complex pattern. In an early study on learning in telegraphy, it was found that after several weeks of practice, the curve for receiving connected discourse showed a plateau which lasted for a considerable time in spite of con-

scientific efforts to improve. Measurement of progress in receiving disconnected letters and words during the plateau for connected discourse revealed, however, that gain in these "lower order skills" was being made. When these elementary responses become sufficiently automatic to permit the development of the more complex integration, the curve for receiving connected discourse began to rise again. (See Fig. 11.)

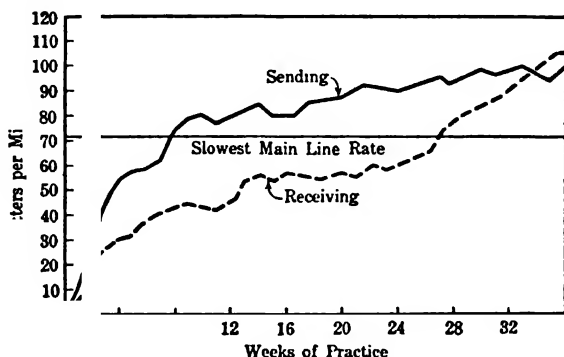


FIG. 11. IMPROVEMENT IN TELEGRAPHY

The upper curve shows the results for transmitting messages, the lower the rate of receiving. Note, just above the word "receiving," the plateau which extends over a period of nearly ten weeks, followed by a rapid rise. The line marked "slowest main line rate" indicates the slowest rate at which commercial messages are sent. (From Starch, *Educational Psychology*, The Macmillan Company, after Bryan and Harter.)

Could plateaus caused by an underlying organization of simpler skills into more complex response patterns be avoided by practicing the larger unit from the beginning? In some performances, at least, this has proved possible. Having subjects practice on word units from the beginning, rather than upon isolated letters, tends to circumvent plateaus in typewriting which are due to the coordination of part responses into a new whole.¹²

In an experiment involving the estimation of time, direction, and force of a swinging pendulum, the task was arranged so that it could be presented and learned as a complex whole.

or broken into elements each of which was learned separately. The learning curves of subjects who attended to the whole complex throughout the course of learning showed no plateaus.¹³

A new experiment in learning telegraphy has revealed that the plateaus that occurred in the original Bryan and Harter investigation (see Fig. 11) may not be inevitable. When forty-three college students spent most of the time in a one-semester course in telegraphy on receiving, and practiced receiving and sending at different times rather than simultaneously, no prolonged plateaus occurred, and in some cases none at all appeared, and the curves showed initial positive rather than initial negative acceleration.¹⁴

Short-Time Fluctuations in the Curve of Learning. Although the plateau is not a universal characteristic of any function or any person, short-time, day-to-day ups and downs are practically universal. (See Fig. 9.) These fluctuations are due to temporary habits, good or bad, differing bodily conditions, interests, distractions, incentives, varied states of readiness, or other temporary influences. Individuals will have not only good and bad days, but good and bad hours or minutes during the same day, often for reasons that are difficult to discover.

Educational Implications of Learning Curve Data. Do these facts concerning curves of improvement have any significance for the guidance of learning? They certainly suggest that the teacher should make continuous inventories—not merely periodic examinations—of pupils' progress. As a means of forestalling plateaus due to inefficient practice procedures, these appraisals should not only measure output, but should also reveal the learners' methods of study and of attack on their tasks. It is particularly important in the early stages of learning to detect errors which, if allowed to persist, may become difficult to break and may impede progress or make it impossible. By controlling motivation, the organization of units of instruction, and learning procedures, teachers and pupils together may prevent many plateaus. But when they do occur, they should be detected in their early stages, before undesirable

causes are habituated and continued failure to improve destroys interest and confidence. This calls for a careful diagnosis of underlying factors and for constructive treatment—a better gradation of learning outcomes, more meaningful treatment of material, an adjustment of the length and distribution of practice periods, or a fresh approach to revive interest. One of the most productive means of maintaining interest is to make the pupil aware of the improvement he is making. All these considerations emphasize the fact that examinations should be given less frequently for ranking and marking students and more commonly to appraise growth and to diagnose difficulties. Tests should be used principally as learning instruments—as means of teacher guidance and of pupil self-guidance and adjustment. To assign marks for these examinations is likely to reduce their usefulness as means for the effective control of learning.

SUMMARY

The positive suggestions for economy in motor learning are the following:

1. Make a real study of the character of the function to be learned. Pay particular attention to the organization of the performance as a whole. For this purpose utilize such aids as:
 - a. Verbal descriptions and expositions.
 - b. Direct observation of performances or models, supplemented, perhaps, by slow-motion pictures, graphs, or other devices which serve to give a clear picture of the structure of the performance.
 - c. Practice at first with manual guidance only if it helps to get the "feel" of the act as it should actually be performed.
2. Attend to the appropriateness of your own reactions as you learn. Develop the ability to select and utilize fruitful responses by discerning their relevance to the goal, and to detect and eliminate errors.
3. Learn as nearly as possible in the setting in which the act of skill must be really executed. Do not depend upon formal exercise of the parts of a function except where the part offers unusual difficulty, but practice the act as a whole.

4. When integrating previously learned movements into a new performance, pay especial attention to the organization of these responses into a smooth-working pattern.
5. Avoid overemphasis on any one phase of a total act, for this may destroy the balance and effectiveness of the performance. Strive to fit details together into the proper timing and rhythm, or scheme of the entire activity.
6. Avoid stereotyping of activity; skill demands flexibility in attaining the necessary goal.
7. Form and accuracy, rather than speed, should usually be stressed in the beginning. One should strive for refinement and precision more and more as learning proceeds into its later stages.

It is apparent that there is no one curve of learning. The particular form of the curve depends on many factors such as the nature of the skill, the maturity of the learner, the distribution of his practice, and the extent of his practice in related activities. Learning a motor skill is not just learning to do a given act faster. It involves periodic integration of responses into more complex patterns. Plateaus in learning curves are sometimes periods of preparation for a higher integration, sometimes delays due to inappropriate habits, fatigue, and the like. Throughout all learning, short-time fluctuations in efficiency are the rule. From a study of the characteristics of learning curves the alert teacher may obtain suggestions for the appropriate guidance of learning.

QUESTIONS AND EXERCISES

1. Does insight into methods of learning and the detailed operations during performance necessarily result from the possession of great skill in a function? Can you recall instances of great athletes, musicians, or artists who were poor teachers? Are fine scholars necessarily good teachers? Are they more or less likely than poor scholars to be good teachers?
2. Explain just what you do when you whistle. Study your vocal organs while whistling to see if you can learn facts about the activities involved that were not known by you before.

3. Apply the facts given in the text to the teaching of some athletic or recreational skill. Compare with methods you have observed in use.
4. Which is better practice for the varsity crew, rowing in indoor machines or rowing on the water? Explain. Which is better practice for the baseball team, practicing catch, grounders, batting, etc., separately or when playing actual games? Explain. Aside from playing actual games, what supplementary work is desirable? To what extent will throwing baskets in basketball from a stationary position increase ability to toss baskets during active competition?
5. Should the writer attend to the feelings in the fingers or the written product? The singer to the "feel" in the throat or to the vocal product?
6. Can you illustrate from your experiences the seriousness of accidental errors and the difficulty of getting rid of them?
7. Give three examples of skills commonly learned in segments that might be learned more effectively in the forms in which they will eventually be used.
8. Just what is meant by the physiological limit? In what functions have you reached your physiological limit? See if you can increase your speed of tapping or of saying the alphabet.
9. Name functions in which a slight improvement can be attained only at a great cost of time and effort. Name some where the experiment is worth the cost; some in which it is not.
10. How may we determine the optimum development of school functions—reading, spelling, writing, typewriting, speed and accuracy of multiplication? Cite opinions or experimental evidence concerning the degree of efficiency demanded by various vocations.
11. Can you give any illustrations from your own experience in which improvement has been blocked by the formation of inappropriate habits, loss of interest, staleness, or fatigue?
12. What does a pupil in school know about his curve of learning in various functions? What should he know? How might such curves be secured?
13. Criticize this statement: "We learn to swim in winter, and learn to skate in summer." Account for any appearance of improvement as a result of a period of no exercise.

CHAPTER XII



PRINCIPLES OF GUIDANCE IN LEARNING—II

PRINCIPLES OF GUIDANCE

IN THE ACQUISITION OF VERBAL ABILITIES

The Value of Form in Learning. It is much more difficult to learn a series of items in which there is no apparent organization than one in which a form or plan can be discerned. This principle can be demonstrated experimentally rather easily. Guilford¹ had college students memorize three types of number series. Two of the series were presented first: a *Y* series in which the numbers were arranged according to a definite scheme and an *X* series in which there was no plan. The *X* and *Y* series were presented alternately, and exposed for a period of two seconds. After each exposure, the subject attempted to repeat the items. The students were instructed to memorize the series, but were not given the plan of the *Y* lists.

The subjects required an average of 3.2 repetitions to learn the *X*, or unformed, series. For some of the subjects, no form emerged from the *Y* series, and in these cases the average number of repetitions for memorization was 4.6. Those who perceived the plan, however, learned with an average of 1.4 repetitions. Next a third, or *Z*, series was presented, and the subjects were informed that each list was constructed according to certain principles which they were to watch for while trying to memorize the items. When the form failed to emerge in this series the average number of repetitions necessary was 4.25, while an average of 1.2 was sufficient when the scheme was discerned. Looking for form and failing to find it seemed to retard learning, since in the *X* series an average of 3.2 repetitions was sufficient for memorization.

Guilford found from his subjects' introspective reports that

the form did not emerge all at once, but appeared in steps. First, there was a feeling that there was order or regularity in a series, but the subjects could not describe it. The second stage was a recognition of the direction of the organization, for example, an awareness that the numbers were arranged in ascending order. Third, this awareness became more explicit, and finally the specific relationships of the numbers emerged, and could be stated in definite form.

TABLE XIV
ILLUSTRATIONS OF STRUCTURED
AND UNSTRUCTURED NUMBER SERIES *

X	r	Z
2	5	8
3	6	9
7	8	11
10	11	14
19	15	18
24	20	23
29	26	29
32	33	36
48	41	44
58	50	53
65	60	63
72	71	74
88	83	86
91	96	99

* From J. P. Guilford, "The Role of Form in Learning."²

Recently reported studies have indicated that some kinds of grouping, or organization, are more effective than others in learning. In one of the experiments, the subjects were asked to learn a series of numbers in different ways. The numbers were:

2 9 3 3 3 6 4 0 4 3 4 7
5 8 1 2 1 5 1 9 2 2 2 6

Four different but comparable classes of subjects learned or dealt with the numbers in different ways. Class I was told that the numbers (placed on the blackboard in the form above)

were arranged according to a principle, and that both rows were built according to the same rule. They were given three minutes to study the series. (The reader should find the principle on which the two rows are built.) For Class II the numbers were written in the following way: 293 336 404 347. These subjects were advised to read the numbers aloud rhythmically five times, as "two-nine-three." Class III was given the figures on the blackboard as amounts of government expenditures, and told to repeat the numbers aloud five times:

\$2,933,364,043.47 in 1929
\$5,812,151,922.26 in 1936

Class IV was given a lecture on government expenditures in which the following numbers were written on the blackboard and referred to several times:

\$2,933 million \$36,404,347,000
\$5,812 million \$15,192,226,000

In tests one-half hour and also three weeks later, the subjects were asked to write down as exactly as possible all figures which

TABLE XV
REPRODUCTION TESTS WITH NUMBER SERIES*

	<i>Number of Subjects</i>	<i>Percentage of Subjects Making Correct Reproduction</i>
Class I		
Test	29	38
Retest	26	23
Class II		
Test	30	33
Retest	23	0
Class III		
Test	30	20
Retest	21	0
Class IV		
Test	23	0
Retest	17	0

* From T. Katona, *Organizing and Memorizing*.⁴

had been placed on the blackboard in the learning or instructional period. The results are given in Table XV on page 369.

As a result of such experiments as this one, the investigator concluded that various types of grouping may aid learning, but that some are more "adequate" than others. The most adequate are those which are based upon intrinsic relations. The organization of a series of numbers according to a principle is an example of the kind of grouping which seems most effective in learning and in delayed recall. The same author has offered four rules of grouping, which may be interpreted as tentative hypotheses:

- Rule 1. Between members of the same group there is a stronger association than between members of different groups.
- Rule 2. Part of a group has the tendency to reproduce the entire group.
- Rule 3. Groups have their own associations, which may be different from the associations of their members.
- Rule 4. Grouping facilitates learning.⁴

Learning by Whole and by Part Methods. The role of form in learning is closely associated with the problem of the relative superiority of whole and part methods of studying and memorizing. In learning a poem, for example, one might either practice it as a whole, or memorize it verse by verse, or even a few lines at a time. If a person were given an assignment of substantial length, he might study it in its entirety or work at it piecemeal. If the situation as a whole is too long or complicated to deal with as a unit, is it possible to break it into more manageable sections and yet retain the organizing and directing effect of meaningful relationships?

Experimental results on the whole-part problem do not permit a simple and generalized statement of the comparative efficiency of the two methods. A critical analysis of the earlier investigations revealed that the results were statistically valid in only six out of thirty experiments, and that they did not justify any generalization concerning the conditions of economy involved.⁵ Since that time, although the whole method has proved superior to part methods in the majority of experiments, conflicting results have still been secured. For example,

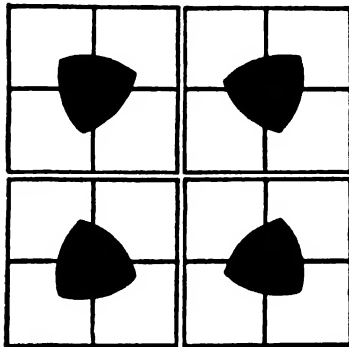
one investigator reported ten experiments on the relative efficiency of whole and part methods in learning poetry, statements in chemistry, and simple directions relating to type-writing. Although the whole method was superior in obtained results in six poetry experiments, the differences could have been due to chance in all but two cases. From the entire group of investigations, the author concluded that there was no general trend of greater economy for one or the other method.⁶

Structure and organization of the material to be learned. Much of the conflict in experimental results and the confusion in interpretation are due to the fact that the word "whole" cannot be used in any absolute sense. A collection of items without systematic order or relation, either spatial, temporal, or ideational, even though repeated as a unit in memorizing, scarcely can be called a functional whole. A list of nonsense syllables, for example, has little internal organization, and one might expect part methods of learning such material to be equally effective, or even more so, than the whole method. Pechstein actually discovered that the progressive part method * was superior to repetition of lists of thirty-two nonsense syllables as a whole.⁷ After examining the results of several investigations, Woodworth came to the conclusion that "where the opportunity for systematic wholeness of response was small, the advantage of the whole method was also small."⁸ In other words, the superiority of the whole method depends upon a high degree of relationship or organization in the material or the activities to be learned. This is to say that wholes should be defined in terms of the organizing relations among the parts rather than merely in terms of a number of items taken together.

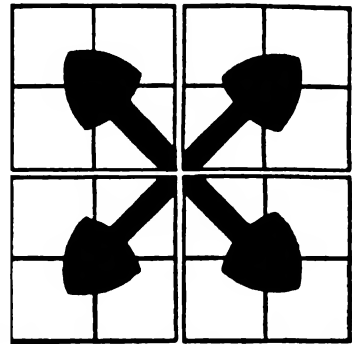
This hypothesis has been subjected to experimental verification, with results that are more suggestive than definite at the present time. The design of the experiments was based on the principle that a whole was not a mere *aggrégaté*, but "a defi-

* In the progressive part method, the whole is divided into sections. Section one is learned; then section two is mastered, and connected with section one. Section three is put together with one and two, and so on.

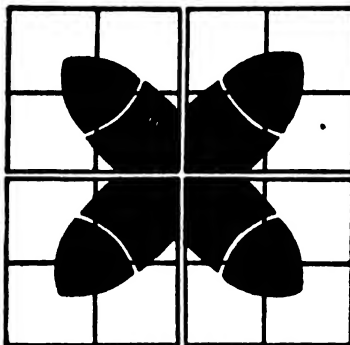
nately segregated, independent pattern which possesses unity, coherence, and meaning in itself above that implied by its parts. Conversely, a part is an element in a total situation which is essential to the meaning as a whole, but which loses its



Problem 1



Problem 2



Problem 3



Problem 4

FIG. 12. BLOCK DESIGN FROM THE SEAGOE EXPERIMENT ON WHOLE-PART LEARNING

Each of these figures, representing various degrees of design integration, was cut into sixteen parts for reassembly by the subjects. (From M. V. Seagoe, "Influence of the Degree of Wholeness on Whole-Part Learning," *J. of Exp. Psychol.*, 1936, 19, p. 761)

peculiar meaning when isolated from the whole." The material in one of the experiments consisted of geometric designs graded from loosely integrated figures to closely integrated ones. The designs, which are reproduced in Fig. 12, were drawn on card-

board and glued to plywood, which was then cut into sixteen pieces. Groups of students assembled the puzzles, either part by part or by dealing with the entire design. The author concluded that the results, though not entirely unequivocal, tended to support the hypothesis that the superiority of the whole method varies roughly with the degree of unity or meaning in the material.⁹

The same person conducted further experiments in an attempt to substantiate this conclusion, using problems in mirror drawing, number codes, chess patterns, and a repetition of the block design. She decided from the results that although the part method resulted in a saving in time and errors in the original presentation, the whole method was most economical in terms of mastery and retention. She concluded that when a whole consists of intrinsic relationships and contains a large ideational factor, the material is more economically learned as a unit than piecemeal. She also emphasized the fact that learning the parts is not equivalent to learning the whole.¹⁰

The approach and comprehension of the learner. The advantage of the whole method not only depends upon material which has a coherent structure and meaning, but upon the learner's effective apprehension of this pattern. There is now a substantial body of data to support this inference. The following experimental results are in point:

1. Intellectually superior children can use the whole method more effectively than "normal children."¹¹ This is probably due to the greater ability of gifted children to understand the meaning of the material as a whole and to identify the significant relations among ideas. Unless the learner can apprehend the design of an integrated unit, the whole method is likely to be no better, or even less efficient, than some one of the part methods.

2. The whole method tends to lose its superiority with long and difficult material. For example, with poems which are easy to understand, continuous in thought, and pronounced in rhythm and rhyme, the advantage of the whole method is strong, particularly when retention is the criterion. On the other hand, if the material is disconnected or hard to understand, the advantage of the whole

method is greatly lessened, and in certain situations may be surpassed by one of the better part methods.¹² The length and difficulty of the material to be learned are both related to the extent to which one can understand and hold in mind the meaning of the situation as a whole. Long and difficult tasks may have to be subdivided for economical mastery. "Pure" part methods in such instances usually prove relatively inefficient. The progressive part method, however, in which each section when mastered is connected with those previously learned, often works advantageously.

3. There seems to be an optimum difficulty of material for pupils of different ages and levels of mental maturity, so far as methods of memorization are concerned. The superiority of the whole method tends to decrease if the material is too easy or too difficult for the learner.¹³

4. There is some evidence that a short period of learning time favors the part method in certain types of material, while a longer period may enable the whole method to demonstrate its superiority.

5. The whole method sometimes appears at a disadvantage partly because many, perhaps the majority, of the subjects in the experiments were accustomed to piecemeal procedures, and therefore managed the newer approach rather ineffectively. The strangeness of the method probably actually frightened them in some instances.

In summary, the most effective method of learning depends, first, on the degree of meaningfulness, difficulty, and length of the material, and, second, upon such factors as the individual's intelligence, age, background of experience, and characteristic methods of study. If a task is too difficult or too long to learn expeditiously as a unit, it may be desirable to break it into segments in order to manage it efficiently. This division should always be made with reference to meaningful units, rather than to arbitrarily separated parts, and with respect to the most comprehensive section that the individual can manage efficiently. Furthermore, even though it should be necessary to differentiate the task into intermediate goals, it is important to try to get a general idea of the whole situation, so that as one works at each part he is aware of its relation to the whole and to the other sections. Thus Woodworth points out that.

whatever the size of the optimal learning unit for a given person, there are certain important "guiding facts" that can be learned only by dealing with the problem as a whole, whether it be a poem, a prose passage, a visual form, or an assignment. These guides, he explains, are the general direction of the goal and the general course of the correct responses. This general orientation, he points out, should be attained as early as possible and used as a frame for organizing the parts.¹⁴

Emphasis in learning on actual performance. By referring to one more experiment, we may emphasize the peculiar advantage of the whole method. Students in elementary shorthand classes in eleven schools participated in an investigation to determine whether it was better to learn by beginning with isolated words and going gradually to phrases and finally to sentences, or by the more comprehensive method of writing sentences from the start. Six schools used the sentence unit, and five, the word unit plan. In every comparison made, the sentence unit method proved definitely superior, in spite of the fact that four of the six teachers who used it were trained and accustomed to the word method. The authors concluded—and this is the point generally relevant to learning by "wholes"—that the sentence method illustrates the principle that *one should learn a thing in a realistic setting and in terms of an actual performance*.¹⁵

Organization and the Curriculum. Implicit in the data on the influence of form and of whole methods in learning is the generally accepted principle that meaningful material is more easily learned and longer remembered than relatively meaningless content. Meaning involves structure; it inheres in relationships. Dewey has pointed out that "to grasp the meaning of a thing, an event, or a situation, is to see it in its relations to other things: to note how it operates or functions, what consequences follow upon it, what causes it, what uses it can be put to." ¹⁶

One of the most important developments in modern education is the substitution of organized learning for the mere acquisition of highly specific and discrete items of information.

Sound educational procedures do not disregard information; rather, they emphasize the learning of facts for definite purposes and in meaningful relations. We have already pointed out that the most important of these relations is that between means and end. The fundamental basis for the organization of experience, therefore, is activity or study directed toward worth-while goals, preferably those constructed cooperatively by the pupil and the teacher. There has also been a reaction against the traditional daily lesson recitation. These small blocks of subject matter were not only remote from pupils' needs and experience in many instances, but frequently constituted relatively independent units. As the pupils studied a lesson (often based upon no more coherent plan of organization than a uniform number of pages) he usually did so without relating it to a more comprehensive problem or movement or idea. Furthermore, there were all too few opportunities, under the lesson-learning regime, to organize the daily fragments at some later point into a coherent system of ideas. The writer recently visited a recitation in which the "lesson" encompassed the end of one large section of the history text and the beginning of the next one. The teacher asked fact questions over the assignment without stopping to summarize the broad topic which had been completed or giving any introduction or preview of the succeeding section, or in any other way taking advantage of the principle of meaningful organization. This is an extreme case, of course, but there are all too many instances which approach it in which teachers do not even utilize what little structure their textbooks may offer.

Reading and Recitation in Learning. Several years ago an experiment using squads of seven or eight children in grades three through eight, and individual adult subjects, demonstrated that a combination of reading and recitation was superior to reading and rereading in learning nonsense syllables and meaningful material in the form of biographies. The "recitation" method consisted in a certain amount of initial reading followed by attempts to recall when not looking at the material

—prompting oneself speedily by glancing at the paper when unable to proceed.¹⁷

More recently a different investigator studied the same problem with whole classes of fifth- and sixth-grade children under normal school conditions. They not only learned nonsense syllables, but also spelling words, arithmetical facts, and English vocabulary. As in the study summarized above, the amount of time devoted to recitation varied in the several experiments from 20 to 80 per cent. In this investigation another variant of the recitation method was used. The children were advised to study the material until they felt sure they had learned it. Then they were to attempt a recall, looking at the answers when they were unable to remember them. They continued to study in this way until the ten-minute period was finished. All children were required to use the recitation method after five minutes whether they felt ready for it or not. Immediate retention and delayed retention (after three or four hours) tests were given. The results for one of the experiments on spelling, with data for all classes combined, are given in Table XVI.

TABLE XVI

COMPARISON OF READING AND RECITATION METHODS ON IMMEDIATE AND DELAYED RETENTION TESTS (SPELLING)*

<i>Method</i>	<i>Mean Scores Immediate Retention Test</i>	<i>Mean Scores Delayed Retention Test</i>
1. Reading	7.17	7.20
2. $\frac{1}{4}$ of time devoted to recitation	7.34	7.79
3. $\frac{2}{5}$ of time devoted to recitation	7.20	7.73
4. $\frac{3}{5}$ of time devoted to recitation	8.49	8.54
5. $\frac{4}{5}$ of time devoted to recitation	8.53	9.02

* From G. Forlano, *School Learning with Various Methods of Practice and Rewards*.¹⁸

The method which employed the largest amount of recitation gave the best results on both tests. In immediate recall, the superiority of this procedure over the reading method was 19

per cent. Although devoting 60 per cent of the time to recitation was significantly better than spending it all in reading, there was little difference between the 60 per cent and 80 per cent methods. The data also indicated that the proportion of recitation had to reach a certain point before its superiority became conclusive. The differences between Methods 2 and 3, and Method 1, were not significant.* The results of all six experiments in the investigation may be summarized as follows:

1. Recitation methods of learning under ordinary school conditions, no matter how small the proportion of time devoted to recitation, were superior to the reading method in every experiment, in terms both of immediate and delayed retention tests. The superiority of the best recitation method over the reading method ranged from 7 to 28 per cent.

2. In general, recitation methods were equally efficient with sense and nonsense material.

3. In general, the superiority of recitation methods was much greater for delayed than immediate recall.

4. For given material and time available for learning, there is an optimum combination of reading and recitation.¹⁹

What are the possible reasons for the superiority of recitation methods of learning? The following have been suggested: (1) it furnishes an immediate goal to work for; (2) it gives exact knowledge of results, leading to economical direction of effort; (3) it confirms correct responses, and induces confidence; (4) it favors an independent and aggressive attitude; (5) it favors the organization of the material into a coherent response pattern; and finally (6) it utilizes this guiding principle: *It considers the situation which life will present and so arranges the circumstances of learning that the individual will secure experiences in making those reactions which will be demanded.*

Reading the material to be learned seems to be particularly valuable in the early stages because it provides an opportunity to explore the situation as a whole, first in the form of a general survey and then in more detailed fashion. Furthermore, recitation, if conducted too early, may tend to establish errors.²⁰

* I.e., the differences could have occurred by chance.

Recent experimentation has emphasized the fact, also, that recall is not particularly useful unless there has been enough previous reading time for adequate understanding of the material.²¹

Other experimental evidence than that on reading and recitation has demonstrated the meager results which passive rereading produces. It has been discovered in one study, for example, that a second reading added only from 6 to 8 per cent in recall to the results of a single reading. On the other hand, making a summary under the guidance of directive questions proved superior to rereading. Reading guided by questions has also produced results superior to those obtained by careful reading and rereading.²² Outlining has aided students significantly in studying history. These methods not only facilitate an active attack by the learner, but also provide means of organizing the material to be learned.

Massed versus Distributed Practice. If a learner has at his disposal seven hours a week for practice in typewriting, playing the piano, singing, etc., how may the time be most fruitfully distributed? Should he work continuously on one day for seven hours, or in half-hour periods with intervals of a half hour, an hour, six hours, or twenty-four? Experiments have not yielded entirely conclusive results, and but few functions have been tested at all. The optimum length and spacing of practice periods depends so greatly upon the nature of the task and upon individual differences in learners that it is impossible to give directions which are valid for all situations. For example, there is some evidence that massed practice is efficient for easy tasks, while spaced practice is essential in long and difficult learning situations. We have already pointed out, in the case of mirror drawing, that spaced practice was necessary for rapid improvement in early stages and that massed practice was effective in attaining speed and in mastering details in later stages of learning. The optimum length and distribution of practice periods is also a function of the age and the experience of the subject. Nevertheless, in spite of these inevitable variations, the evidence clearly shows that, in general, distributed learning is

better than concentrated practice. In several studies, to give an example, it has been economical to break up the available time into periods of thirty minutes or less, separated by intervals of from thirty minutes to twenty-four hours. Thus it would probably be preferable to make use of the seven hours by practicing twice a day for thirty-minute periods; or, if but three and a half hours were available, half-hour daily periods would be advisable.

One should point out, however, that very little research on this problem has been done with verbal and logical material and with children as subjects. It is very likely that under school conditions, with rich and interesting material which can be approached from many points of view and learned through a variety of activities—reading, observing, constructing, speaking, and writing—much longer work periods may be possible even for young children. In fact, there is a tendency in the modern elementary school to dispense with the conventional daily program divided into relatively short subject matter periods, and to substitute a series of activities built around one or more problems or centers of interest. These cores can give continuity and organization to a considerable variety of experiences. Under such conditions as these, relatively long work periods seem to be fruitful. Experience in college military training programs in the languages indicated that good results can be attained under high motivation and intensive work which, however, includes a variety of activities, such as basic language instruction, classroom drill, and conversation in small groups.

The advantages of spaced learning in many tasks, particularly in the early stages, may be due to such factors as these: (1) distributed practice may favor a variety of responses at a time when the correct reactions must be discovered; (2) early massing of practice may tend to establish errors occurring during the exploratory period; (3) spacing makes it possible for one to capitalize a fruitful variation which can then be followed up by more concentrated effort; and (4) spacing may conserve interest and forestall fatigue. It is also possible that, during recess periods, errors may tend to fade out, and one may gain

new insight into the task to take to the next trial.²³ It has been shown that "mental" practice, *i.e.*, imagining that one is doing the task, during rest periods is efficacious in the acquisition of motor skills.²⁴

THE INFLUENCE OF SUCCESS OR FAILURE

Thorndike reports that adult subjects showed little decrease in achievement in an experimental situation when failure or frustration far surpassed the number of successes. Although he found that these persons worked at nearly their maximum capacity when required to continue, he admitted that, under ordinary conditions, they would probably have abandoned the task. Repeated failure under normal circumstances, or even long-continued frustration in an experimental situation, would probably have influenced their accomplishment adversely. Certainly children need the stimulus of success. Success reinforces performance, releases further energy, and engenders favorable attitudes toward learning. Repeated failure, on the other hand, puts a drag on learning. Constant frustration discourages effort, gnaws viciously at interest, and begets indifference, resistance, or even severe inferiority.

The reactions of a group of kindergarten children learning to recognize words illustrate the facilitating influence of success and the inhibiting effects of failure. The learning activities were set up as a game. Some children who failed to recognize the words for several periods began to show severe distaste for the task. One ran behind the piano to hide when the teacher came into the room. One said, "I'm tired of it. It makes me mad. This old game is no good." But when these same children, through more careful individual teaching, began to succeed at the game, their attitude changed completely. They expressed enthusiasm for the game, and were eager to play.²⁵

In a study with nine-year-old boys, the subjects first took nine tests from the VIII, IX, and X year levels of Form L of the Revised Stanford-Binet Scale, then played a game in which half the group succeeded and the other half failed, and immediately afterwards took the tests in Form M of the intelligence scale

corresponding to the ones previously taken from Form L. The results showed that success led to increased scores and that failure served as a depressant. Furthermore, success led to an increase in the average ratings given the subjects by the experimenter and observers on willingness, self-confidence, and attention, while failure resulted in a decrease in the ratings on these traits. Failure also was reflected in increasing tension and a desire to escape from the situation.²⁶

Results of Failure in Basic Skills. Other studies confirm the finding above and emphasize the importance of correct learning in the early stages of the process. A child who fails to acquire certain basic skills in reading when it is first taught finds his problems progressively acute as he meets learning situations which make greater and greater demands on reading ability. Continued failure due to reading disabilities all too frequently engenders such emotional disturbances as the following: nervous tension and habits like stuttering, nail-biting, restlessness, and insomnia; defense reactions such as noisiness, defiance, or sullenness; withdrawal from normal social contacts; counterattack, including destructiveness, cruelty, or bullying; daydreaming; extreme self-consciousness; and complete defeat.²⁷ Recent studies of reading disability have revealed that failure is more often the cause of personality problems than the result of emotional difficulties.

Experts in the psychology of reading have demonstrated that a carefully individualized and scientifically developed program of reading instruction can effect a striking improvement in reading ability, general achievement, and emotional adjustment. This was the result of a project at Speyer Experimental School in New York City involving six classes of children in grades two to five. Five of these classes were composed of "dull normals," that is, children with I.Q.'s ranging from 75 to 90. The other group consisted of reading disability pupils. Those in charge of the experiment doubted the general assumption that their subjects, because of poor achievement and low intelligence, were unable to acquire linguistic abilities. They believed, rather, that these pupils' difficulties had been caused

in large part by attempting to learn in schools where methods and materials had been unsuited to them.

Instruction consisted of an activity program built around such centers of interest as a comparison of country and city life. Pupils engaged in a great variety of experiences. Reading and other linguistic activities appeared only to the extent that they proved interesting and productive in connection with the major purposes of the program. However, the teachers attempted to arrange as many reading situations as possible which contributed to the central projects. They used very little isolated formal instruction in reading, and made every effort to adapt materials and methods to the needs of individual pupils. Definite instruction with proper equipment lasted only three months, and the amount of time given to reading was not very great. In spite of these conditions, the remedial reading class, composed of disability cases, made a gain of thirteen months in reading ability. The other classes gained from eight to thirteen months in comprehension. Although the average I.Q. of the pupils was only 82, all of the classes but one attained at the end of the year a reading ability equal or nearly equal to that reached by normal pupils at the same point. The comments of those in charge of the experiment are worth quoting:

It is the consensus of all who visited the school during the first and last month that the most conspicuous changes wrought during the term were in the children's behavior and in their attitude toward the school and learning. When they entered they were mostly disappointed, if not disillusioned, pupils whose previous work in classes containing a large number of superior children and with assignments beyond their ability had produced almost continuous frustration. As the result of the persisting difficulty and failure, they revealed various forms of unfortunate adjustments—sullenness, inattentiveness, fearfulness, embarrassment, annoyance, mischievousness, discourtesy. Before the term was over most of these unfortunate attitudes had disappeared. Children came to school with interest and eagerness. They had learned how to co-operate with one another, to respect and work with the teacher, and to enjoy as well as profit by the various learning activities which comprise the school day. The most obvious outcomes of the

year were, in many respects, amazing changes for the better in school interests and action. . . .²⁸

Individualization is essential for efficient learning, both for prevention of disabilities and for remedial treatment. We would be astonished with the improvement of pupils' achievement if we were adequately to adjust materials and methods of teaching and learning to individual differences in interests, previous experience, and levels of aptitude and maturity. Furthermore, we could do much to aid the learner if we would praise more often than reprove, give positive directions rather than make negative demands, and place emphasis upon successes rather than upon failures.

Level of Aspiration. Success is not a simple matter, psychologically. It is related to the *level of aspiration*. As this term has been employed in experiments in motivation, it means the level of future attainment which the individual sets for himself in some task. Success, then, is interpreted experimentally as a performance that is equal to or better than the level to which the individual aspired. Similarly, failure is considered to be achievement that is under the level which the individual proposed to attain. The level of aspiration may serve several purposes. In some instances it may serve as an incentive, that is, it may represent a goal or the desire to improve performance. Sometimes the individual may set his goals much too high in terms of his real ability, but persist in keeping them there in spite of failure to attain them. One explanation of this persistence is that the individual feels that to aspire to outstanding achievement is socially praiseworthy, and so he maintains his self-esteem by keeping his ambitions high. Other persons, however, may interpret failure to attain their goals as a threat to self-esteem. Then they may lower their level of aspiration to avoid failure and deflation of the sense of personal worth.

Success and failure, so far as the individual's subjective experience is concerned, are relative to the level of aspiration. If one's level of aspiration is much lower than his possibilities of attainment, he may interpret relatively meager achievement

(meager in terms of some objective criterion) as success. On the other hand, a person whose level of aspiration is unduly high may have a sense of failure when, in relation to ability, he had actually done very well. Thus, psychologically, success is often more dependent on what the individual's goal or expectation is than upon actual performance. It is probably important for one to set standards of performance for himself which are attainable with reasonable effort, but which are not too easy or too hard. If the task set for the individual is obviously too difficult for him, he may sense no failure because he considers the work beyond his ability. If the task set is obviously too easy, he may gain no feeling of accomplishment because he considers it below his ability. It has been discovered also that, after success, the level of aspiration is likely to be raised and, after failure, lowered. The best situation is one in which a person keeps his expectation at a level consistent with his powers of attainment. This means that achievement standards should be individual rather than general or absolute. It is possible for teachers and parents to permit able pupils to set goals far below their ability, and to drive those of modest aptitude toward unattainable levels with unfortunate consequences.²⁹

The level of aspiration is closely related to success and failure in college. Many potentially gifted students are making mediocre scholastic records or worse. Personnel workers frequently find it difficult to diagnose these "underachievers," or to stimulate them to better accomplishment. Sometimes these persons are unaware of their own level of aptitude. Often, their academic experiences fail to challenge their interest and effort. Too frequently, they go to and through college without clear-cut purposes, either educational or vocational, or are unable to see any relation between academic work and their occupational goals. Previous experiences, including emotional difficulties, may also have caused them to lower their levels of aspiration.

Many college students find it necessary to lower, rather than raise, their levels of aspiration. Study after study of the vocational intentions of high school seniors and college freshmen

has revealed that a large number of students had chosen occupations for which their measured aptitudes and achievements were entirely inadequate. For this reason, educational and vocational guidance at the college level for some students may become one in part of "down-grading." This reduction in level of aspiration is often a difficult adjustment to make at the time. But if it is accompanied by constructive guidance toward occupational goals consistent with real interests and abilities, the student will have a much more successful and satisfying college life and vocational experience. The secondary school should improve its guidance activities as rapidly as possible, so that a wise foundation for an intelligent vocational choice can be laid before college entrance. Colleges, too, must develop personnel functions so that students may be distributed among curricular offerings with respect to their actual interests, aptitudes, achievements, and needs.

Knowledge of Improvement. If our conclusions with respect to the importance of success in learning are sound, knowledge of improvement should act as a strong incentive. Experimentally, this problem is somewhat difficult, since changes in the subjects' scores from one learning period to another must represent an actual increment or decrement rather than fluctuations due to changes in the difficulty of the task. This factor was effectively controlled in the most decisive investigation of the problem conducted under normal school conditions. Two equivalent groups of 358 fourth-grade pupils each were given identical arithmetic drill exercises fifteen minutes a week for twenty-one weeks. The only variable was specific knowledge of improvement. The members of the control group never received their weekly scores. Those in the experimental classes, however, kept individual progress charts, and pooled their losses or gains in a graphic representation of improvement for the class as a whole. The record of actual improvement was made possible by using drill units for which comparable standards had been provided. This scoring device compensated for differences in difficulty of the tasks.

The group which had continuous information concerning

improvement made significantly greater gains than the control group. The distributions of gains for the two groups as a whole were divided at the first and third quartile points to study the effect of the incentive at different ability levels. The pupils in the experimental group were superior in the highest quarter and middle 50 per cent of the distributions. However, there was little difference between experimental and control subjects in the lowest fourth of the groups. In fact, neither group made much gain at this level of ability. The incentive factor had little opportunity to operate.³⁰

Reward and Punishment. The "law of effect" (see page 318) has given impetus to many experiments on the influence of reward and punishment on learning. Thorndike himself has conducted or directed a large number of these investigations. Using monetary rewards, or simply saying "right" to the subjects when they performed correctly, he has amply confirmed his generalization that satisfying consequences strengthen the responses which they directly follow. He has discovered other interesting and significant facts concerning the operation of rewards. The influence of a reward is greatest when it follows the response immediately, and its potency decreases as the interval between a reaction and its after-effect increases. In Thorndike's experiments at least, proximity seemed more important than relevance to the learning situation in determining the influence of rewards. Thus he reported that a satisfying after-effect strengthens somewhat the connection to which it is attached, even though it is essentially unrelated to the purpose for which the response was made and incongruous with the wants and interests of the person at the time.

The Irradiating Effect of Reward. The effect of reward may also spread from the reactions to which it is directly attached to others in close proximity. The spread is both backward and forward; connections in the neighborhood of the directly rewarded one may also be strengthened, even if they are themselves punished. The spread may also take a sidewise direction, to strengthen responses which are being made at the same time, or which are accepted as belonging to the one to which the

reward is attached. This phenomenon suggests that, in applying rewards and punishments as a means of controlling behavior, one should let the individual know exactly what responses are being rewarded and punished. Even then, the effects may spread. In daily life, it is probable that many incorrect or undesirable activities are established because of their accidental temporal proximity to responses which are directly satisfying or which have been deliberately rewarded by someone.³¹

The Effect of Punishment on Learning. We have already noted the fact that Thorndike, contrary to his earlier expectations, discovered that annoyers do not actually weaken connections. Some of his more recent experiments on punishment have produced even more striking results. He has found that punished connections may be more, rather than less, likely to recur! This happened in experiments of the following type. He gave the subjects a list of nonsense words each of which was followed by four English words, one of which was supposedly related to the stimulus word. This choice had been arbitrarily made by the experimenter. The subjects were asked to guess the "correct" response. As soon as they made a choice, they were told "right" or "wrong," or perhaps rewarded by small amounts of money or punished by an electric shock or a money fine, and given the next stimulus word. In summarizing evidence from experiments comparable to this, Thorndike reached the following conclusion:

In multiple-choice learning by human subjects where the situation vanishes immediately after the choice, is replaced by another, and recurs only after intervals of fifty to 200 seconds filled by other . . . situations and responses, a connection "punished" by the announcement of "Wrong" or "Wrong" plus one or more electric shocks, or "Wrong" plus a money fine is (practically without exception) strengthened by the occurrence in spite of the annoying after-effect.³²

The question which then arose was what would happen if the subjects kept guessing until they hit upon the correct

response before going on to the next stimulus situation. They would thus be "punished" for incorrect responses, but would have the satisfying after-effect of a reward for the right one before moving on. The next time through the list, would the punished responses still be more, rather than less, likely to recur? An experiment showed that in the "retained," as in the "vanishing" situation, "the occurrence of the wrong response strengthens the connection more than the punishment offsets." ³³

As a result of these and other experiments, Thorndike came to the following conclusion:

The attainment of active rather than passive learning at the cost of practice in error may often be a bad bargain. . . . The learner's self-punishment when he makes a mistake may sometimes be no better than the punishment in our experiments.

The almost universal tolerance of imperfect learning in the early treatment of a topic, leaving it to be improved by the gradual elimination of errors in later treatments, is probably unsound and certainly risky. What removes the errors (later) is the rewarding of right connections and such rewarding might better be put to work earlier.³⁴

This is a rather sweeping generalization, especially so in view of the fact that it was drawn from the results of investigations in which the correct reactions were arbitrarily rather than logically determined, so that the subjects could get no insight into the tasks they were asked to learn. The question immediately arises as to whether Thorndike's experimental results and conclusions would be corroborated with meaningful material. It is an important issue, since Thorndike's conclusion seems to run counter to the modern emphasis on active learning emphasizing self-discovery. An ingenious experimental attack on the problem was made recently by Stacey. His entire investigation is too extensive to summarize completely here; only the most relevant results will be outlined.³⁵

The subjects were one hundred sixth-grade pupils. The learning material consisted of a list of fifty items each composed

of five English words one of which did not "belong" with the other four owing to some principle inherent in the choice of these words. Ten different organizing principles were used, each principle being represented by five items. For example, the "paired verb-object" principle makes *swim* out of place in the following sequence: (1) water (2) ate (3) drank (4) egg (5) swim.

The "retained" situation method was used. Each stimulus situation of five words was presented to the subject on a piece of cardboard. When the subject made the correct response he was "rewarded" by being told "right"; when the response was wrong, he was "punished" by being told "wrong." In every instance, he kept the card until he hit upon the correct response (which might be the first reaction, or might follow from one to four wrong choices). Each subject was given five consecutive trials over the entire list of fifty items.

The one hundred subjects were divided into five equal groups, which were given correspondingly five different amounts of information concerning the nature of the task, as follows:

- Group 1. Merely told that one of the five words in each item did not belong.
- Group 2. Informed, in addition, that there was a reason in each case why the extraneous word did not belong (but not given any of the particular reasons).
- Group 3. Merely told what the extraneous word was.
- Group 4. Given the word and told there was a reason why it did not belong.
- Group 5. Given the extraneous word and also told what principle was involved.

It was presumed that Groups 1 and 2 would have to take the most active attitude if they were to make the correct choices and discover the underlying reasons. For the other three groups, the correct responses were identified, and in the case of Group 5, the reasons for the correct choices were also given. Presumably the latter procedures would reduce initial errors to the minimum, so far as this experiment was concerned.

The experimenter found that the results confirmed Thorndike's data on the efficacy of rewards and the inadequacy of punishment in learning. He discovered, however, that in the situations that provided an opportunity for self-activity and discovery (Groups 1 and 2) errors were less detrimental to learning than in cases in which the correct responses were identified for the subjects (Groups 3, 4, and 5). In the former situations, the subjects learned as many or more correct responses and discovered more underlying principles than in the cases in which the correct choices and reasons were authoritatively identified for them.

Stacey concluded that the broad generalization of Thorndike quoted on page 389 was contradicted by his investigation: " 'The attainment of active' (self-discovery) 'rather than passive learning' (authoritative identification of responses), 'refusal to supply information on the ground that the learner will be more profited by discovering the facts by himself,' and 'tolerance of imperfect learning in the early treatment of a topic,' so far as they characterized this experiment, actually made for greater achievement, more success in discovering the reasons for correct responses, and more rapid elimination of incorrect responses."

It seems reasonable to expect that other experiments using meaningful material rather than employing arbitrary responses will strengthen the case for active learning and self-discovery.

How Punishment Functions. Even though annoyers do not seem to act directly on connections to weaken them, they nevertheless probably serve a valuable purpose in learning activities where errors do occur. Thorndike has concluded, as a matter of fact, that there is probably slightly more rapid learning with punishment than without it. He suggests several possible values of punishment. It may serve to counteract a satisfying after-effect of undesirable behavior. It may cause the learner to shift to other responses—perhaps to do something desirable and satisfying. Punishment may give information, particularly concerning the consequences of responses which otherwise might go unnoticed. Finally, punishment may act as a motivator.

Thus the learner may try to escape it, or to speed up his search for the correct response. Punishment may likewise cause the learner to pause long enough to make a discrimination between essential cues to the solution of a problem. The informative and motivating functions of punishment may account for the fact that certain experiments have shown punishment on the correct responses to facilitate learning.³⁶ Intense punishment, however, may have a disruptive effect. When the task is easy or moderately difficult, an increase in intensity of punishment may speed up learning and reduce the number of errors. If the task is difficult for the learner, however, increasing the intensity of punishment may quickly cause disruption rather than facilitation.

One must interpret the experimental results on reward and punishment with considerable caution. What the experimenter described as "rewards" or "punishments" may have been interpreted quite differently by the subjects. Nevertheless, we can take certain cues rather definitely from the available research. First of all, we may be fairly sure that neutral responding—that is, reactions unaccompanied by some consequence such as reward or punishment, satisfaction or annoyance, or knowledge of correctness or error—is a wasteful form of activity. The things that count in learning are the things that matter in relation to wants and goals. Second, in Thorndike's words, "we may increase our confidence in positive, rather than negative learning and teaching." Learning takes place through the selection of satisfying responses—those which satisfy an individual's wants or constitute the means of attaining his goals.

RETENTION AFTER VERBAL LEARNING

Experiment and experience have so accustomed us to the rapid deterioration of the results of learning that we have become "philosophical" about the educational losses represented in curves of forgetting. We have come to consider it inevitable that people will forget almost immediately a large percentage of what they have learned and that the ultimate residue will be only a fraction of what was once memorized.

Forgetting is an ever-present fact of human behavior to grapple with, but recent studies suggest that the extent of depreciation is not as serious or unavoidable as we once thought.

The "Ebbinghaus" Curve. It is true that the earlier investigations were discouraging. The dotted line of Fig. 13 is the

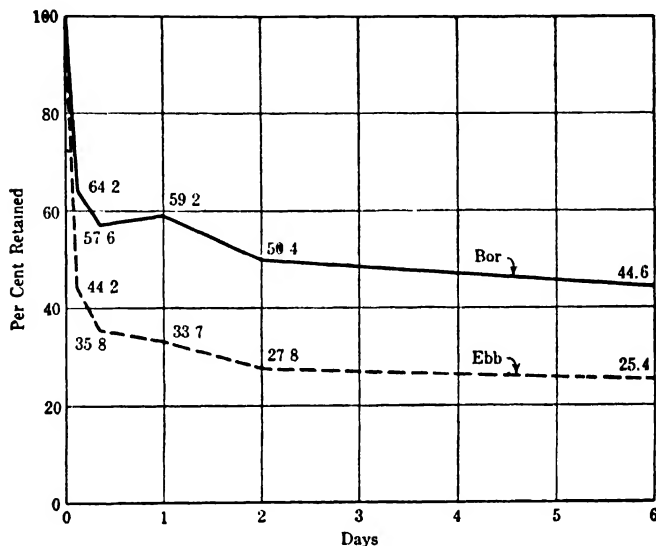


FIG. 13. RETENTION AFTER DIFFERENT INTERVALS

Curve of retention of lists of nonsense syllables, as determined by the saving method. The Ebbinghaus curve is from one subject about forty years old who learned and relearned over 1,200 thirteen-syllable lists. The Boreas curve gives the average for twenty students, each learning one fifteen-syllable list for each interval. (Data from Ebbinghaus, 1885, and Boreas, 1930, after R. S. Woodworth, *Experimental Psychology*, Henry Holt & Co., 1938.)

retention curve which Ebbinghaus found in 1885 for lists of nonsense syllables.³⁷ At the end of the first hour, his subject had retained only about 44 per cent of what he had learned, and by the end of the first day, the loss had reached two-thirds of the original material. After six days, retention had dropped off more slowly to about 25 per cent. Since these results were reported, numerous studies of forgetting of nonsense material and of school subject matter have confirmed the general shape

of the "Ebbinghaus curve," although the loss has been less in many instances, and the drop in the curve often less abrupt.

Overlearning and Forgetting. Ebbinghaus and many other psychologists have based their studies of forgetting on functions barely learned, usually to the point of one correct repetition. Other experiments, however, have indicated that the rate at which forgetting occurs depends mainly on how strong the responses were at the beginning of the period—that is, on how

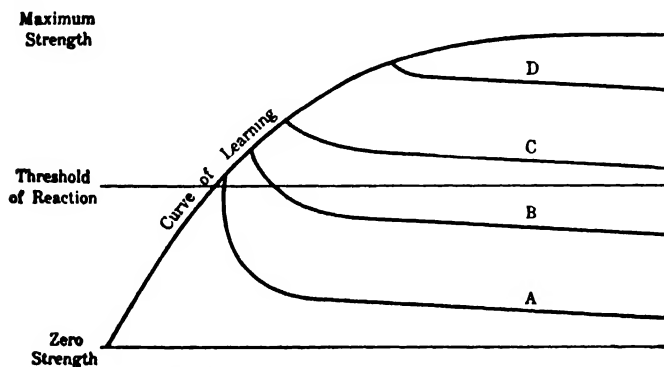


FIG. 14. PROBABLE RATE OF FORGETTING IN THE CASE OF FUNCTIONS OVER-LEARNED IN VARIOUS DEGREES

Curve A shows the rate of forgetting which occurs when the function is barely learned. The initial loss is rapid and great, followed by a much slower rate of deterioration. B, C, and D show probable losses in functions which are over-learned slightly, considerably, and greatly, respectively. In all cases, after the rapid initial loss, the strength of the connections steadily but slowly decreases.

much they were overlearned. Reactions greatly overlearned, such as our names, the alphabet, and many familiar words, or motor acts such as holding a pencil or humming "Home, Sweet Home," will probably function after thirty, forty, or more years of disuse, although they will have lost more or less of the original promptness and ease of action.

Figure 14 illustrates roughly the probable curves of forgetting which may follow various stages of overlearning. These relations, however, are merely estimates. They are intended to present roughly the general facts that the rate of forgetting

depends upon the degree of learning and that loss goes on both above and below the threshold of response.

Retention in School Subjects. Many of the studies of retention in school subjects have shown large losses, even over the summer vacation. Nearly every college teacher of mathematics complains about his students' deficiencies in the elementary processes of both arithmetic and algebra. An analysis of poor test papers in a college class in statistics showed recently that the errors were due primarily to mistakes in arithmetical computation. In the elementary school, teachers usually devote the first weeks of each year to reviews of the previous year's work. Much of the research in educational psychology in recent years has been devoted to the development of techniques of diagnosis of deficiencies and means of remedial teaching. Many of the breakdowns in scholastic abilities, of course, are due to poor learning and teaching in the first place; others are the result of forgetting. We have room below for only a few illustrations of the retention studies in school subjects.

One class in 7B history had forgotten approximately one-eighth of the material at the end of four months; one-sixth in eight months; one-fourth in twelve months; and one-third in sixteen months.³⁸ After a three-month period, a college botany class lost 43.4 per cent of the information it had had at the end of the school year. By the end of six months, the loss reached 47.8 per cent. After fifteen and twenty months, the decrement amounted to 74 and 76 per cent, respectively. Students who possessed more botanical information at the end of the course retained, not only absolutely, but relatively, more of this knowledge after a lapse of three or six months.³⁹

Elementary school subjects seem to differ in their susceptibility to depreciation. Although the studies do not always agree, there has been a tendency for reading ability to suffer little or no loss, or even to show a slight gain, over the summer months. Arithmetic reasoning has also held its own over the vacation. Deterioration has often appeared however, in arithmetic computation, spelling, and specific factual data in the content subjects. A study of the retention of knowledge over

the summer vacation as measured by two administrations of the Stanford Achievement Test (an examination covering the principal elementary school subjects) revealed that eighth- and ninth-grade pupils suffered no serious loss with the possible exception of arithmetic computation. Fourteen of the twenty-two subtests showed small gains. The largest gain was in reading. Pupils with higher mental ages lost less and gained more than those with lower levels of mental development.⁴⁰

Retention of Different Learning Products. Recent developments in the appraisal of learning have thrown new light on the problem of forgetting by making possible studies of retention of different learning outcomes. Tyler, for example, attempted to determine whether information that is seldom used will be forgotten more quickly than explanations that can be commonly applied in everyday life and methods of thinking that can be employed in practical situations. He gave three tests in science, first in September, and then eight months later. They were the Ruch-Popenoe General Science Test (which is mainly informational), together with an explanation test and a generalization test which were constructed for the investigation. There was a distinct loss over the eight-month period in the factual Ruch-Popenoe test, but only a very slight difference in the scores on the explanation and generalization tests.⁴¹

Comparable results in the same field were secured in another investigation.⁴² In this instance, the ability to remember factual material, the ability to explain scientific phenomena, and the ability to draw conclusions from data were measured. Retention was measured over the summer months. The greatest loss was in the ability to remember factual material, amounting to about 17 per cent. Decrements in the other two powers were much smaller, amounting to only 9 per cent in the case of the ability to explain scientific phenomena. In all three abilities, the losses were greatest for students in the lowest levels of intelligence.

Understanding and Retention. There is clear evidence that meaningful material is not only more easily learned than non-

sense stuff, but that it is also remembered longer and more fully.⁴³ Now we have strong indications that understanding is much less susceptible to impairment than specific information. Not only do the two investigations reported above justify this hypothesis, but two others somewhat different in nature add substantial evidence to the point. One of these studies revealed that although the retention of verbatim statements decreased

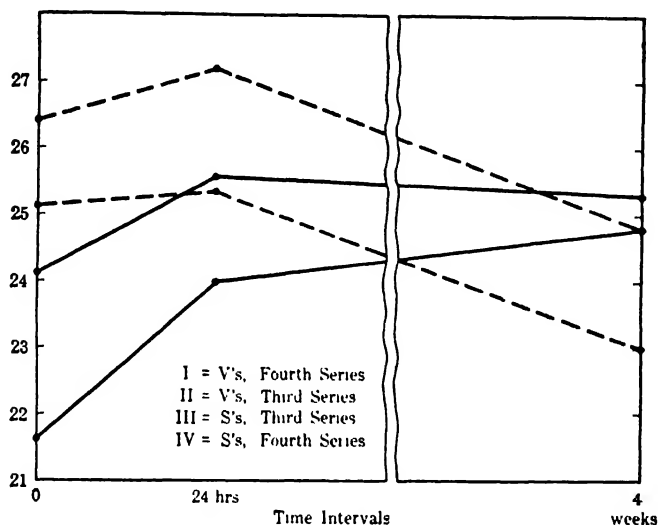
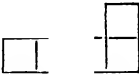


FIG. 15. COMPARISONS OF VERBATIM AND SUBSTANCE MEMORY

The broken lines are for verbatim memorization, and the solid lines for the retention of the substance of the material (Adapted from H. B. English, I. L. Wellborn, and C. D. Kilham, "Studies in Substance Memorization," *J. of Gen. Psych.*, 1931, 11, 233-260.)

materially over the period of the experiment, the recognition of the substance of the passages either remained at the same level, or showed an actual gain. (See Fig. 15.) The results showed that it made little difference how many repetitions (from one to five) the subjects had. At the end of thirty days they could still recognize successfully the general idea of the passage. The number of repetitions, however, made a considerable difference in their ability to recognize verbatim sentences correctly.⁴⁴

The effect of understanding on retention was the subject of an investigation in which the subjects were asked to make

four squares out of five arranged in this fashion  by changing the position of three sides. One group was repeatedly shown one solution for the problem as a means of memorizing it. Another comparable group was taught the principle by which this particular problem and others like it could be solved. The group which learned by understanding showed no loss, but a slight gain, in the ability to solve old and new tasks over a four-week period. The subjects who had tried merely to memorize the solution showed a steady deterioration in both old and transfer problems.⁴⁵

The record for remembrance of general ideas and principles is a much more encouraging picture of the permanent results of education. These outcomes are probably of greater importance in life and in further schooling than the retention of great bodies of specific information. But here a word of caution is essential, for a great deal of "soft pedagogy" has grown up around an emphasis on broad understandings and a disparagement of factual learning. It is this: *An understanding of ideas and principles grows out of a wealth of specific data.* One may expect to forget much of the factual material in the end and retain the idea, but the idea cannot be acquired meaningfully without utilizing details at the time. Actually, if facts are organized into meaningful relations and generalized into a principle, the details themselves are likely to be better remembered than if they were acquired in discrete fashion.

The Factor of Organization. In retention, as in many other aspects of the economics of learning, the factor of organization looms importantly. Analyses of the recall of stories have disclosed that the details which were remembered were those consistent with the meaning, or structure, which the persons originally got out of the narration. If they failed to sense the true plot, in successive attempts at reproduction they dropped out the persons, objects, or events which were inconsistent with

their interpretation. Furthermore, details were modified, or added from previous experience, to round out whatever scheme was gleaned from the original story or constructed in the course of repeated efforts at recall.⁴⁶ These data reinforce our admonitions to make learning meaningful, and to establish the essential relations, or structure, of the task as a whole as clearly, accurately, and comprehensively as possible. Adequate organization in original learning makes for permanence and for exactness of recall.

Retroactive Inhibition.⁴⁷ Psychologists once ascribed forgetting almost entirely to the effects of disuse and fading out of impressions. Now, however, they are inclined generally to the view that it is mainly the result of an active process of interference, or of interaction between old and the new learning. The fact that a child who learns 7 times 8 are 56 on Monday cannot recall it correctly on Friday may be due not so much to lack of practice on it between times as to the fact that he has learned other number facts in the interim which could somehow be confused with the first one. This sort of interference has been called retroactive inhibition.

Experimental studies of retroaction are arranged in such a way that the learner's achievement on the original task is measured directly after the first learning period, and also after a subsequent period during which some other material is learned. The material placed between the original learning and the retest on the original material is called "interpolated learning." Control subjects learn the same original material as the experimental ones, but substitute some sort of rest for the interpolated activity. "Rest" may have a variety of meanings, such as sleep, reading humorous magazines, or singing. The degree of retroactive inhibition can be determined by comparing the loss of retention on the part of experimental subjects with that of the controls. The purpose of retroaction investigations is to determine the conditions under which an activity may be expected to interfere with the retention of previous learning.

Unfortunately, little research on this problem has been

conducted with the materials or under the conditions of school-room learning. Nevertheless, the results of laboratory studies have significant implications for educational procedure, some of which are indicated in the following partial summary of recent experimental evidence on retroactive inhibition:

1. *Similarity of original and interpolated activities.* Some retroaction may occur when original and interpolated activities are extremely dissimilar (in content, meaning, form, environment, method, etc.). As their similarity increases, retroaction also increases. This occurs to a certain point beyond which retroaction tends to decrease with further increase in similarity up to the condition of actual identity, where reinforcement may occur. Example: The probability that the date of an historical event will be remembered is greater if the next activity is the reading of narrative material concerning that event than if the subsequent task is learning more dates.

2. *Temporary position of the interpolated activity.* Interpolation immediately adjacent either to original learning or to its recall is likely to cause more interference than is interpolation well removed from the extremes. Which of the two extreme positions causes the greater detrimental effect is still uncertain. The implication here is that if one has reason to believe that certain learning activities are likely to interfere with the retention of previous learning, one should avoid placing the two tasks too close together. For example: if certain French words are very similar in appearance or pronunciation, the teacher might do well to present them in context in different class periods rather than together in a word list.

3. *The degree of learning of the original activity.* The greater the degree of learning of the original material, the less susceptible will it be to interference. Accordingly, any procedure that will help one to learn better will also aid him to remember more efficiently. This should discourage the student who gives his work only cursory attention, intending to learn it better at a later time. At that later time, he is likely to find that intervening learning has disrupted his original insecure

achievement, and that his previous "saving" of time has turned out to be an actual loss.

4. *The degree of learning of the interpolated activity.* The degree of interpolated learning seems to be positively, though not proportionately, related to the amount of retroaction up to a certain maximum point, probably that at which the degree of learning of the interpolated material approaches that for the original activity. Application: If the teacher finds that only ten minutes of the class period remain for the development of a point not easily explained in less than half an hour, it would be wiser to leave it until the next class period. Poorly developed ideas presented hurriedly (as long as they fall short of a reasonable degree of mastery) are just the type of interpolated material which is likely to interfere with what was learned during the first part of the recitation.

5. *Familiarity with the material.* With increasing amounts of practice or previous experience with what is to be learned (both original and interpolated), the susceptibility to retroactive inhibition decreases. This principle should make teachers less impatient with their pupils' inability to grasp new concepts and generalizations as they are presented. The science teacher may read two new discoveries without confusion, because he has a broad background of understanding into which to fit the new knowledge. When he presents first one and then the other of these new discoveries to his high school class the next morning, however, their meager background may be insufficient for really understanding either one. The consequence is interference between the two concepts—that is, retroactive inhibition and low retention.

6. *Nature of the learning material.* Both verbal and motor activities are subject to retroactive inhibition, particularly the former. Both sense and nonsense materials are subject to retroaction, especially nonsense material.

Meaningful material, while apparently not so susceptible to retroaction as is nonsense material, seems to be most subject to retroactive inhibition when interrelationships are formed

between original and interpolated tasks, as in the case of learning lists of adjectives so arranged that words in the second list are synonymous with those in the first list. When meaningful original learning is followed by unrelated interpolated activity, or when original learning is unrelated to meaningful interpolated matter, there is less retroaction. In other words, when there are strong meaningful relationships within a body of material (either original or interpolated), the chances of retroaction are lessened.

Here is further support for those educational activities which stress meaning, understanding, and organization. Whatever aids the pupils to clarify their concepts and to organize and integrate their knowledge is just so much insurance against retroactive inhibition and forgetting. Example: A mass of unorganized facts about an author's life and writings is a fertile field for retroaction. The integration of those facts into a broad understanding of what that author's writings stand for, the influences which made him write in a particular way, and the basic ideas represented in his works presents a different psychological situation; the meaningfulness of the learning becomes a preventive of interference effects from subsequent activities, and retention is consequently better.

In general, those conditions which contribute to the construction of well-organized patterns of knowledge and skill reduce retroactive inhibition to a minimum.⁴⁸ Previous experience, meaningfulness of material, intelligence, and general maturity have such an effect. On the other hand, retroaction tends to increase under conditions that contribute to disorganization or confusion of original and interpolated learning materials. Similarity between original and interpolated activities (alter a certain departure from identity), introduction of interpolated activity in close temporal proximity to original activity or to its attempted recall, and use of nonsense material are conditions with this negative effect. In the measure that the teacher guides pupils toward understanding and organization of knowledge around meaningful relationships, he is facilitating greater retention. In the measure that he presents work in disorgan-

ized, unrelated fashion, he is creating an ideal situation for rapid forgetting.

We repeat again that there is no one curve of forgetting. The amount and kind of forgetting depend upon many factors involving the meaningfulness and organization of the material, the degree of original mastery, and the amount and character of interpolated activities. The permanence of schooling is in great degree a function of the quality of the initial learning.

SUMMARY

Learning and recall are closely related activities. Whatever makes for effectiveness in learning facilitates retention. Rote learning or the memorization of nonsense material is more susceptible to deterioration than meaningful content. Discrete factual information is forgotten much more rapidly than coherently organized material. Information which is not used may be quickly lost, but well-understood and widely applied general ideas are retained much more successfully. Understanding the principle involved in the solution of a problem is one of the best means of remembering how to manage the same or a similar problem at a later date; merely memorizing the steps in solution without understanding their rationale, on the other hand, is inviting poor retention.

In general, what is most thoroughly learned is most resistive to impairment. One should learn a given task well before going on to other activities, particularly if the subsequent ideas or responses are likely to be confused with the antecedent ones. The most important factor in learning for good retention is probably that of organization. One should relate what is to be learned into a coherent structure, or organize it in terms of some integrating principle, so that the individual items are carried, so to speak, by the intrinsic pattern. The membership relations within the unit will then be such that the recall of one component of the entire situation or activity will tend to reinstate the others with which it is functionally associated.

Whatever facilitates meaningful organization, therefore, not only makes learning more economical, but increases the

probability that the product will be available in the future. Grouping is an effective learning procedure, particular if it is based upon intrinsic relations. Learning by wholes, utilizing the largest meaningful unit of which the individual is capable, takes advantage of the influence of organization. Active efforts to recall are useful because they establish the goal to be attained, provide practice in a realistic form, and assist in organizing the material into a compact pattern. Distributed practice in difficult tasks gives opportunity for seeing into the situation and perceiving essential relationships. Knowledge of progress, constructive diagnosis of difficulties, and systematic efforts to evaluate successive trials in the light of definite criteria or standards of performance contribute to the discovery and utilization of means-end relations. Rewards and punishment may provide significant information concerning the success or failure of responses, emphasize desirable or undesirable reactions, or cause the learner to discriminate between leading and irrelevant or misleading cues.

The curriculum as a means of guiding learning should encourage the student to organize his ideas in systematic fashion. If the school stimulates the learner to develop new and purposeful relationships of his experiences, it will have succeeded in making his education meaningful and useful, more available in the future, and, as we shall see in the chapter on transfer of training, more capable of being applied in new situations.

QUESTIONS AND EXERCISES

1. Of the towns and cities you know which one has the best scheme for naming streets? Explain which one is superior by using a principle of learning developed in this chapter.
2. Criticize the use of "flash cards," that is, large cards of printed words that are "flashed" to view and quickly removed, as a means of increasing the span of perception of words in ordinary reading.
3. If you were to employ the "whole-part-whole" learning sequence, how would you teach a child:

- a. a piano selection.
 - b. to make a dress.
 - c. a poem.
 - d. the names of all the states.
 - e. to play baseball.
4. Explain why learning to read German does not enable one to write it or to understand spoken German. Would it be wise to learn in one way or another according to our need to read, write, speak, or understand it when spoken?
 5. Why is it that some people have difficulty in understanding a passage when they read it aloud to a group?
 6. In some Chinese schools all the boys in a study room recite aloud and continuously. What are the advantages and disadvantages of this mode of study? Would you recommend it for our schools?
 7. How would you teach a child to write better English compositions? Show how the principles offered in the chapter apply. Would it be worth-while to have the student read or copy good compositions written by others?
 8. Try this experiment on three different groups. Ask them to guess the length of time which passed between signals. You will say "Ready!" and in a moment "Now!" Then allow an interval of ten seconds, at the end of which you again say "Now!" The members of the group then write their estimate of the interval in seconds. Repeat with other intervals such as six, eight, fifteen, fourteen, ten, eighteen, nine, etc., until thirty trials have been made. With a second group, use the same intervals and the same number of trials, but after each trial say: "The time was more than ten seconds" or "less than ten seconds" as the case may be. To a third group, state the exact length of the interval after each trial. Compute the improvement for each group. Compare and explain the results.
 9. Taking into account the facts concerning recitation versus re-reading, the distribution of intervals in learning and review, the whole versus the part method of study, plan the most effective method of study for this course in psychology.
 10. It has been said that in early life man gathers material to build a bridge to the moon. In middle life he uses it to make a woodshed. Interpret this in terms of *level of aspiration*.
 11. Can you see any advantages in taking but few notes during a

lecture and writing out a full account later, in comparison with taking very full notes during the lecture and reading them over later? Could you test these or other methods experimentally?

12. Try an experiment upon improvement in reading. For practice, attempt to speed up in your daily reading for thirty days. Give yourself a test, at about the same time each day, by getting someone to time you while you read for ten minutes as rapidly as you can comprehend. For test material use a book of moderate and uniform difficulty. Record the number of lines read on each ten-minute test. Plot a "curve of learning."
13. Compare your progress with that of others. At the end of thirty days, see if you think you have reached your limit. How can you be sure whether you are on a plateau or at your physiological limit? Test your judgment by continuing the experiment. Was the general curve uniform or irregular? Can you account for the small variations from day to day?
14. James states that "Nothing we ever do is in strict scientific literalness wiped out." Just what is meant by this? Certainly, experiences are "forgotten," that is, cannot be recalled consciously. What has become of them and how may they function? What evidence can you cite to show that some trace of past experience may function years after it is forgotten in the sense that it cannot be consciously recalled?
15. List some instances in your own school experience in which interfering activities greatly affected learning or remembering. Cite other instances when retroactive inhibition was minimal. Discuss the particular nature of the retroactive inhibition in each case.
16. How is a child's level of aspiration related to his degree of motivation? Under what circumstances may his level of aspiration be too high? Too low?
17. It has been said concerning learning, "Easy come, easy go." Cite evidence from this book or other sources to reveal the fallacy in such a statement. Under what conditions may such a statement be true?
18. Why is it a useful rule in preparing assignments to read and study an outline of the chapter both before and after reading the contents?

GENERAL REFERENCES

Many concrete and usable suggestions for guiding learning and promoting good study habits are found in the following:

Bird, C., and Bird, D. M., *Learning More by Effective Study*, Appleton-Century Co., 1945.

Robinson, F. P., *Effective Study*, Harper & Brothers, 1946.

For technical summaries of the experimental evidence on the problems of economy in learning, see:

Kingsley, H. L., *The Nature and Conditions of Learning*, Prentice-Hall, Inc., 1946, Chs. 4-5, 8-13.

Stroud, J. B., *Psychology in Education*, Longmans Green & Co., 1946, Chs. 13, 14.

It is worth-while to supplement a general knowledge of the learning process with a more extended acquaintance with the psychology of learning in subject matter fields. The following chapters deal with the psychology of language including the vernacular and foreign language; the fine arts; the natural sciences; and the social sciences:

Judd, C. H., *Educational Psychology*, Houghton Mifflin Co., 1939, Chs. 12, 13, 21, 22, 23.

The following book may be looked upon as a full treatment, so far as the evidence is available, of how we learn to read. As the result of intensive investigation, more is known, probably, about this matter than about any other educational problem.

Gates, A. I., *Improvement in Reading*, 3rd ed., The Macmillan Co., 1947.

An experimental study indicating that under certain conditions, at least, exposure to incorrect forms in spelling and grammar were not hindrances to improvement, is reported in:

McIntosh, J. R., *Learning by Exposure to Wrong Forms in Grammar and Spelling; an Experimental Study of Correcting Wrong Forms as a Practice Method*, Teachers College Contribution to Education, 1944, No. 892.

CHAPTER XIII



THE DEVELOPMENT OF MEANINGS

The story is told of a student who wrote on his examination paper, "The French Revolution wrote insulting letters to the American Revolution." He insisted, when questioned about this statement, that it was a paraphrase of what the teacher herself had said. Investigation revealed that the teacher had stated that "the French Revolution corresponded in a rough way with the American Revolution."¹ If the student had used the instructor's exact words, instead of paraphrasing them, he would not have revealed his misinterpretation. Neither teacher nor student would have been aware of mistaken meanings.

Much of what passes for learning in the classroom is really little more than empty verbalism—memorizing or paraphrasing verbal statements without understanding them. Unfortunately, verbalism often characterizes the statements of teachers as well as of pupils. The writer once listened to a conventional question-and-answer recitation in history which covered the organization of the Federal Reserve System. As long as the teacher and the pupils both used the language of the textbook, everything apparently went well. But when one member of the class asked what the Reconstruction Finance Corporation was, the teacher replied that it was substantially the same as the Federal Reserve Bank. That comment was a rather clear indication that most of her statements about the Federal Reserve System had been sheer verbalism; she had not really understood what she or the book had said.

MEANING THE CENTRAL PROBLEM IN EDUCATIONAL PSYCHOLOGY

The Nature of Meaning. In spite of emphasis on learning through firsthand experiences in the community, and on sup-

plementing verbal symbols with maps, models, charts, pictures, and other visual aids, language will continue to be the chief medium of instruction. The dependence of learning upon language is inevitable, because language is the means of conveying ideas and the vehicle of thought and understanding. Words are used to symbolize specific experiences or meanings; they also are means of expressing relationships in experience. Sentences serve the purpose of organizing words and their meanings in relation to one another. Words are also the means of *classifying* experiences, or labeling them in terms of their common characteristics. Verbal symbols are therefore instruments for dealing with highly *generalized ideas* in the thought process. These considerations make it clear that one of the *central problems* in education is how meanings or ideas develop in the course of learning and how we get meaning from spoken and written language.

We use the word "meaning" constantly in our ordinary conversation. We point to the sky and say, "These clouds *mean* rain." We indicate markings on the pavement, and explain that they *mean* that no passing is allowed. The teacher tells the child that the + sign *means* to add. The geologist explains that the formation of certain fossils *means* that they were once part of the ocean floor. More frequently, perhaps, we recognize meanings implicitly, and act accordingly. The child quickly learns to "sense" its father's mood from facial or postural signs. One of the early stages in learning to read is to follow simple printed directions. The advanced student of a foreign language gets the meaning of spoken or written discourse directly, without the intermediate process of translation into English.

Basic Meanings. The raw material out of which complex meanings are finally constructed is sense perception—the immediate awareness of the world about us (and the apprehension of our own movements). The child becomes more and more aware of the detailed aspects of objects—his perception is constantly refined. Likenesses and differences are discriminated; experience is enriched by noting the specific characteristics which things possess.

We identify objects, we attain definiteness in perception, by making adjustments to them. Perceiving is an active process. Dewey explains this significant principle in the following way:

The acquisition of definiteness and of consistency of meanings is derived primarily from practical activities. By rolling an object, the child makes its roundness appreciable; by bouncing it, he singles out its elasticity; by lifting it, he makes weight its conspicuous distinctive factor. Not through the senses, but by means of the reaction, the responsive adjustment, is an impression given a character marked off from qualities that call out unlike reactions.²

The characteristics of objects change as the child finds uses for them. Children often define words in terms of the uses to which they may be put. For example, they may describe a chair as "something to sit on." The fact that the meaning of objects changes as our adjustments to them change emphasizes the importance of active rather than passive methods of education. The school should give the child an opportunity to explore, to handle, and to use for worth-while purposes, the tools, the materials, the concrete realities of his world. It is equally important to lay the foundation for social concepts in satisfying, wholesome, helpful, cooperative relationships with other persons. These social activities are as concrete and real as those which are concerned with things and their relationships.

The process of identifying objects, naming them, and noting their specific characteristics is often called the development of *primary* or *basic meanings*. This sort of learning goes on apace in childhood, but it extends throughout adulthood as well. If the demands upon us make it necessary or useful, we constantly make finer discriminations by noting details not previously perceived, or relationships not discovered before. Observation is improved by training. Thus a course in biology "opens one's eyes" to organisms and events he might otherwise never see. The student of botany notes characteristics of plants which the uninitiated would probably not distinguish. A checker in a manufacturing plant may detect faults in the product which an ordinary individual might entirely overlook.

A psychiatrist may identify incipient symptoms of mental disorders which are unnoticed by laymen. This apprehension of our surroundings, this richness of experience, is exceedingly important in itself. But the objects it throws into sharp relief can serve another purpose in the development of meanings. These objects may acquire a derived or symbolic meaning, which is an important phase of the development of ideas.

Derived Meanings. With experience, objects acquire the function of representing or signifying other things and events. Derived or symbolic meanings arise when experience signifies more than is immediately perceived. What, then, is the meaning of anything? Simply what it represents, what it refers to or points to. When objects stand for other things, they become *symbols*. Man uses things constantly for this purpose —

All fashionable clothes . . . are highly symbolic: materials, cut, and ornament are dictated only to a slight degree by considerations of warmth, comfort, or practicability. . . . Again, we select our furniture to serve as visible symbols of our taste, wealth, and social position; we trade in perfectly good cars for later models, not always to get better transportation, but to give evidence to the community that we can afford such luxuries; we often choose our residential localities on the basis of a feeling that it "looks well" to have a "good address" . . .³

Development of Word Meanings. Verbal symbols, of course, are the ones we use most frequently. This phase of meaning can be illustrated in the development of word meanings by young children. The first point to remember is that a word is itself an object. Words are definite stimulus situations, in spoken or in written form, to which the individual reacts just as he responds to other events or conditions in his environment. The child may repeat words, parrotlike, without using them in meaningful fashion. But when he hears other persons use a word in direct connection with an object or event, it soon acquires a *representative* function. Saying "doll" to a child as one hands him the object helps him to establish the belonging between the word and the doll itself. The verbal

reaction or the verbal stimulus finally acquires the character of a symbol. It signifies, or represents, the real thing. Ultimately, the child learns to use or interpret words to symbolize objects, situations, or relationships which are really absent at the time. Furthermore, the use of these word symbols enables him to *think about* things which are not present to sense, and to communicate these meanings to other persons.

Meaning in Reading. Learning activities in the early stages of reading illustrate the process of developing word meanings by using verbal symbols in connection with actual experiences, and later using words to represent these experiences. The background for reading is often an excursion, let us say, to a grocery store, a zoo, or a boat. As the children explore, watch what the clerks, animals, or sailors do, or actually perform some operations themselves, the teacher is careful to use words that characterize these experiences. The pupils, too, are encouraged to use the same words—to verbalize their experiences while they are enjoying them. Back in the classroom, the children and the teacher talk over their recent experiences. They use the words they heard and spoke “on location.” But now the concrete situation is absent. The words fulfill a representative function—they signify what the children saw and heard and did on the excursion. As the discussion proceeds, the teacher may write on the blackboard a series of sentences describing their experiences. This becomes the content of a *meaningful* reading project. What meaning do the pupils get when they read these statements? Just what the symbols stand for—their experiences in the store, or the zoo, or the boat. In a very real sense, they do not get meaning *from* the printed material, but *take meaning to it*.

DIFFICULTIES IN THE COURSE OF DEVELOPING MEANINGS

Meaning Depends on Experience. This illustration suggests a fundamental general principle: *words mean only what they represent in our experience*. Poverty of ideas is therefore associated with meagerness of contact with the world of things and

persons. Horn, who probably has made the most careful analysis of the problem of meaning in the social studies, points out that "language stimulates and guides the formation of ideas rather than imparts them . . . we do not give the student meanings; we merely stimulate him to construct them for himself." ⁴ These ideas, he emphasizes, the student must build for himself out of the materials of his experience:

For the words of the printed page, as has been pointed out, are wholly symbolic. Only insofar as they are related to the experience of the reader can they either convey correct ideas or stimulate their construction. Unless so related, even statements of the simplest and most concrete matters are unintelligible. "To him that hath shall be given." For example, the sentence, "He lost his way in a blizzard," must of necessity have limited meaning for one who has spent his whole life in Florida. When the words or statements in the text are familiar to the reader and stand for ideas he has previously evolved from his experience, the recall of these ideas is relatively easy. Frequently, however, the reader has neither formulated the idea for which the words stand nor experienced the elements out of which it may be built.⁵

Properly organized words, supplemented by pictures, sound effects, graphs, dramatizations, and other devices often do convey with reasonable fidelity ideas that the pupil has not experienced directly. In other words, one can, to some extent, gain experience *vicariously*. Getting meanings vicariously is probably a matter of degree. In some instances, the ideas will be fairly complete and accurate; in other instances they may be sketchy and fuzzy. In any event, it is important for teachers to recognize the difficulty with which we obtain satisfactory meanings from verbal statements without relevant concrete experience.

Difficulties in Understanding Abstractions. When language represents very concrete things or events, it is difficult enough to understand it; when it is used to express generalized or abstract ideas, the problem of obtaining adequate meanings is even more severe. Textbooks at all levels abound in general concepts and expressions of abstract relationships. This is not

only true of subjects like science and mathematics, but is characteristic of the social studies as well. Small wonder that, under these conditions, the child often finds it necessary to resort to empty memorization of words. It is not surprising that a study of high school students' meanings of historical vocabulary uncovered such confusions as the following: conservative with conservation, rebate with debate, precedent with president, premier with ambassador, insurrection with rebellion, legislation with legislature, appropriation with donation, precedent with preceding. Students wrote such sentences as the following: "The precedent president before Roosevelt was Hoover." "A budget is a very useful instrument in the kitchen." "All conservatives are radicals and should be jailed." ⁶ Another investigation of the comprehension of American history by eighth-grade students yielded the following result: "The children's concepts of the Supreme Court were varied and inadequate. Some children knew that it was the highest court in the land but they could not tell what was meant by the highest court. Some knew how many justices there are in the court but few could tell just what they do. Others were not able to tell what sort of cases were tried in this court. Only one or two children were able to explain how cases go to this court by appeal." ⁷

Excessive Vocabulary Loads. All investigations of the vocabulary load (which of course signifies meaning or concept load) of elementary and secondary school subjects show that the student has an excessive learning burden. This is equally true of college courses. An analysis of seven science courses which were prerequisite to courses in home economics produced the following rather startling results:

1. The seven courses used about 5,500 technical terms, when words derived from the same root were counted only as one term.
2. The vocabularies in the several courses were very specific; for example, only 157 of the 3,900 terms found in zoology, physiology, and bacteriology were common to all three courses.
3. Most of these terms were found so infrequently in the assigned readings that there was little probability that students would learn them. For example, in inorganic chemistry, zoology, and

physiology, from one-half to two-thirds of the technical terms appeared less than five times.

4. Less than one-fifth of the technical vocabulary met in any of the science courses which were prerequisite for foods and nutrition courses were common to the sequent courses.

5. The technical vocabulary of final courses tended to be less extensive than that in the courses which were prerequisites for them.

The futility of this kind of excessive vocabulary demand is summed up in the following comment on these data: "Investigations . . . of the rate at which people learn indicate that it is impossible for students to acquire new vocabulary at the rate which is presumably expected, *to say nothing of acquiring an understanding of the meaning of the content and the ability to see how it relates to actual problems.*" *

Meaning Depends on Context. Symbols do not invariably mean the same thing; the behavior they evoke may change from one occurrence to another. To determine whether a speaker is serious or is jesting, it is often necessary to watch his face for cues to supplement the words. We are more likely to accept criticism without resentment if it is given in a general attitude of helpfulness rather than one of censure. An innocent remark received without notice in peacetime might brand the speaker as a "fifth columnist" during war hysteria. Countless illustrations could be given of the fact that the *meaning* of an object, event, or symbol depends on the *context* in which it occurs.

It is important to note that the meaning of a word is very largely a matter of *social usage*. When one studies the way in which words are used to convey ideas, he is struck with the fact that a given verbal symbol does not have a fixed or uniform meaning. The meaning of a word changes with its context. Consider, as an illustration, the various meanings of "run" in the following sentences:

You have a run in your stocking.

This train runs from Chicago to Minneapolis.

The vine runs up the house.

This well runs dry in summer.

The child's nose runs.
The color in this cloth runs when it is washed.
Never run into trouble.
The words of an old song run through my head.
To run a horse is inhuman.
He made a good run for Congress.
The run in the hills was full of water.
The run of events is clear.
We had a run of good luck.
This farm has a cattle run through the fields to the pasture.

There are many other senses in which the word "run" is used. It is said to have over a hundred meanings. Which one it signifies in a specific case is determined by the context.

The context often gives us the meaning of a word or phrase which is unfamiliar. The following series of sentences has been used to illustrate how some meaning for the word "oboe" might be derived from context:

He used to be the best *oboe* player in town. . . . Whenever they came to that *oboe* part in the third movement, he used to get very excited. . . . I saw him one day at the music shop, buying a new reed for his *oboe*. . . . He never liked to play the clarinet after he started playing the *oboe*. He said it wasn't so much fun because it was too easy.

Although the word may be unfamiliar, its meaning becomes clear to us as we listen. After hearing the first sentence, we know that an "oboe" is "played," so that it must be either a game or a musical instrument. With the second sentence, the possibility of its being a game is eliminated. With each succeeding sentence the possibilities as to what an "oboe" may be are narrowed down until we get a fairly clear idea of what is meant (Hayakawa).⁹

Limitations of Context as Aid to Meaning. It is important to note, however, that anyone who had never heard an oboe or seen the instrument would still have a very incomplete idea of what it is. There are definite limitations to the extent to which context itself, apart from actual experiences with things, can provide basic concepts.

This difficulty is not only apparent when words are used to

refer to very specific and concrete situations, but it is accentuated when they represent complex relations or general ideas. Many of the ideas in science, social studies, and other school subjects are both strange and difficult, and the context in many instances will provide only limited cues to the meanings of these verbal expressions. Yet we have been told that one of the purposes of the school is to extend and enrich experience, vicariously, through reading. If it is so difficult to understand words without actually experiencing them with the situations they symbolize, can one learn vicariously? We have already said that one can. It is important to remember in this connection, however, that the reader has to construct meanings. That is, he attempts to share another's experience by selecting and organizing those aspects of his own experience which are relevant to the words and contexts before him. If the reader's relevant experience is meager, or if he has never used the writer's words to symbolize his own experience, he is likely to get a vague idea of what is meant, or an incorrect conception or perhaps no meaning at all. Vicarious experiencing proceeds largely on the basis of analogy. Since we must construct ideas from our own experience, the richer our firsthand contacts with objects, persons, situations, and events, the more successful we will be in understanding and enjoying what has happened directly to others.

Wealth of experience, however, is not enough. The act of reading is more than recall of experiences which are relevant to the words in which the material is written. Reading is also a process closely allied to thinking or problem solving. Proper selection of meanings out of the many experiences which might be associated with a given word or group of words is almost always necessary. The appropriate meanings must then be grouped or organized, and the proper emphasis given to the relations which are involved. Comprehending the meaning of a selection is, therefore, an active and constructive mental process which is controlled in part by the organization of the words themselves and in part by the mental set, interest, or purpose of the reader.

Getting Meaning through Understanding Relationships.

There is a much broader sense in which meaning inheres in context. We have already pointed out that historical events become meaningful as they are related to other happenings of the same period and to events which occurred previously or subsequently:

Charles Beard has deplored scholars who treat "life as an inorganic one-thing-after-another and history as a string of anecdotes." He has insisted that "as long as the various divisions of history are kept separate, each must be incomplete and distorted; for . . . the philosophy of any subject (that is, the truth of it) is not at its center but on the periphery where it impinges on all other sciences."¹⁰ In his book on the growth of American civilization, Beard has attempted to see the life of a time, and the trends in American history, in all their inter-related phases. Wound together are political, economic, social, and cultural activities—and biological and psychological factors as well—a seamless web, as Beard and others have called the structure of human life. One cannot understand any one phase of history without understanding its relations to other human institutions. In discussing the machine age, for example, the Beards explain the effect of industrial mechanization and rapid technological change, not only upon economic processes and political institutions, but also upon American slants of thought, modes of living, manners, and esthetic expression.

Things which stand alone mean little. It is when they are related to other things that they take on significance. Dewey had this function of context and relationship in mind when he said:

Since all knowing, including all scientific inquiry, aims at clothing things and events with meaning—at understanding them—it always proceeds by taking the thing inquired into out of its isolation. Search is continued until the thing is discovered to be a related part of some larger whole. Thus a piece of rock may be understood by referring it to a sedimentary stratum known to have been formed under certain conditions. . . . Suppose the rock has peculiar markings on it [which] . . . may arouse inquiry. If so, the

resulting investigation will have for its purpose the removal of the apparent isolation, the non-connectedness, of the markings. Finally, they are explained as glacial scratches. They no longer stand alone. They have been brought into connection with a past era of the earth's history in which great masses of slow-moving ice descended into regions now temperate, carrying with them grit and rocks that ground and scratched other rocks imbedded in place.¹¹

Students who get real zest from learning are those who actively relate what they learn, instead of compartmentalizing it and leaving it neatly wrapped up in course packages. By relating and organizing knowledge and insights from many sources, they make education a constant process of discovery, and learning, the continuous extension and refinement of meanings.

THE IMPROVEMENT OF UNDERSTANDING

"Find the Referents." We have discussed the difficulty of understanding even those verbal symbols by which writers refer to very concrete objects, and have commented briefly on the much greater difficulty of getting the meaning of symbols used to represent abstract ideas. It is extremely important, particularly when dealing with problems that strongly affect human welfare, to be sure that we understand what writers and speakers mean to say. Perhaps we should also make an effort to detect language which sounds impressive but which, upon analysis, turns out to be practically meaningless. How can we detect the meaning of a passage? Students of language have proposed that we do so by finding the *referents*—determining what objects or situations the verbal symbols actually represent, or point to.¹² To understand what a writer or speaker means to say, we must discover what his words stand for in his experience—in other words, determine *his* referents. It is often extremely difficult, however, to determine an author's referents. We have already given several illustrations of the faulty meanings which students secure from their reading. Why is it so difficult to get another person's meaning accurately? In part, because the words an author uses may not refer in the reader's

experience to the same things which the author is attempting to represent. Sometimes the reader may have little or no experience at all to which the symbols are relevant. In the former instance the reader gets some other meaning than that which the writer expected him to get, and in the latter, he gets no meaning at all.

The Bases of Understanding and Misunderstanding. It is now easy to see how people apparently understand each other in a discussion, but actually end far apart in their meanings. Two persons really understand each other only when the words they use refer to the same sorts of experiences—essentially the same kinds of objects, events, situations, or relations. Fortunately, there is a great deal of commonality in the lives of most of us, and in the words which we use to symbolize our common experiences. On many occasions, therefore, we understand each other fairly well. But if our verbal symbols stand for different rather than similar referents, we are very likely to misunderstand each other. As long as the discussion is purely verbal, we may be oblivious of the misunderstanding. But when we resort to some particular activity in connection with the matter at hand, our lack of agreement may be revealed. It is also possible, of course, to think we disagree when we actually are of the same mind. This can happen when we use *different language* to signify the *same referents* without knowing it.

The problem of understanding human discourse is not always as simple as identifying the referents. Sometimes an individual may use language as a deliberate means of disguising his real ideas or his actual purposes. In other instances, he may be unconsciously giving expression to certain fears, conflicts, or wishes. To get the real significance of language in such circumstances, it is necessary to interpret it in terms of the deep-seated motives within the personality. The expression of these underlying mechanisms is often indirect rather than straightforward. Although all these factors in the interpretation of language are important, we shall gain greatly in understanding in most instances by trying to find the definite situations which verbal symbols are used to represent.

Probing the Significance of General Terms. We are prone to roll high-sounding words over our tongues without any preciseness of meaning. Such words or phrases as "democracy," "communism," "fascism," "capitalism," "social justice," "liberalism," and "the American Way," are good examples. Unfortunately, the fact that one is verbally opposed to fascism is no assurance that he is equally opposed to specific forms of fascist behavior. An ingenious investigation of student attitudes called, first, for acceptance or rejection of certain *generalized* attitude statements concerning fascism and, second, for the same sort of reactions to specific fascist *practices*. Many students professed antagonism toward fascism in general but approved specific political, economic, or social activities which judges had classified as definitely fascist in character.¹³ In using such terms as those above, it is wise to keep in mind the specific *activities and relationships* which the symbols refer to, and it is certainly prudent to expect others who use the terms to be equally able to point to relevant forms of action. A recent treatment of the problem of obtaining definite meanings for abstract terms suggests that one ask such questions as the following: "What would happen if this did not exist?" or, "How would the situation differ if it did not exist?" or "What would have to be done to this to accomplish a certain result?" Thus, one might ask, "What would happen if *democracy* did not exist in this country?" or "What would have to be done to establish *international justice*?"¹⁴

Improving Comprehension by Simplifying Vocabulary. Enough illustrations of pupils' erroneous concepts and of the difficulties of understanding verbal symbols have been given to emphasize the fact that aiding students to get accurate meanings from their reading is one of the most important problems of instruction. What are some of the fruitful means of improving comprehension?

One proposal which has been evaluated experimentally is to simplify the vocabulary of reading material in social studies, science, and other subjects. In his study, Nolte used as the original reading material three selections from a carefully con-

structed test of reading comprehension designed to measure paragraph comprehension, organization of ideas, grasping and understanding significant details, and comprehension of total meaning. He then revised these selections, using only those words which appear in the first 2,500 of the Thorndike Word List. These are words which occur with high frequency in reading material for children and adults. The second simplification was made by translating the selections into "Basic English." Basic English, a system devised by C. K. Ogden of Cambridge University, consists of 850 words which are names of "things, acts, directions, and qualities with simple, regular rules for putting them together into smooth English." This relatively simple vocabulary supposedly is sufficient to express all meanings essential to normal, nontechnical discourse. One of its principal purposes is to make possible the translation of abstract expressions into more concrete and realistic forms. In making these two revisions, care was exercised to retain the original meanings, and in order to check on the success with which this had been done, the selections were submitted to five competent authorities in the fields concerned. Sixth-grade pupils were tested on their comprehension of the original and revised selections. Although the substitution of simpler words definitely aided comprehension on a few individual items of the test, there were no differences in understanding among the three forms in which the selections were presented which could not be accounted for by chance. The experimenter cautioned against minimizing the importance of vocabulary in relation to reading difficulty but pointed out, nevertheless, that "using a master word list based upon mechanical word counts or a word list of extremely narrow limits is insufficient in itself to make material more readable."¹⁵ Other studies have shown that simplifying the vocabulary of literary selections did make the content much easier to grasp. There is abundant evidence, furthermore, to show that the proper selection of words, gradual introduction of new words, and careful grading of the vocabulary are essential in preparation of reading material. These factors, plus the complexity of sentence structure, are systematically

controlled in acceptable basic reading texts and supplementary reading materials. Modern textbook writers in arithmetic, social studies, science, as well as in foreign language and other secondary school fields, are careful to control vocabulary load. Nolte's study is particularly valuable, however, in emphasizing the fact that, in addition to vocabulary and other structural elements of discourse, *the inherent difficulty of the ideas in relation to pupil experience* plays a major role in meaningful reading.

This point is illustrated by the fact that although the following sentence is made from words in the first two thousand of the Thorndike word list, it is a difficult one to understand: "The square of the sum of two numbers is equal to the square of the first added to twice the product of the first and second added to the square of the second."¹⁶ Note how comprehension is affected by the intrinsic difficulty of the concepts involved and their remoteness from the experience of the reader.

Improving Comprehension by Vocabulary Training. Another means of aiding comprehension is to give students systematic vocabulary training. There is a considerable body of research which confirms the value of this procedure. Experiments have shown, for example, that well-organized methods of promoting the understanding of mathematical terms stimulate better learning in that subject.¹⁷ Specific training on the meaning of geographical terms in historical material improves pupils' comprehension of history.¹⁸ Direct attention to the meaning of historical terminology has proved fruitful if the instruction is given on the terms, not in isolation, but in "such a manner that it amplifies the meaning of the specific historical situation in which the meaning occurs."¹⁹ In a recent experiment, incidental and direct methods of developing the meanings of words encountered in history were compared. In the one group, the teacher gave no guidance in vocabulary development except as individual children came to her desk for help. In the other group, the teacher gave specific vocabulary assistance throughout the study periods. Her purposes in this instruction were (1) to stimulate clear, vivid associations between

word meanings and their oral and written symbols, (2) to promote the habit of using context in deriving the meaning of words and phrases, and (3) to provide opportunities for pupils to use new words appropriately in oral and written expression. On vocabulary tests given at the end of the experiment, the pupils who had had systematic instruction in word meanings were much superior to those who had received only incidental guidance. The authors of the study pointed out that wide reading alone, while valuable, is not as effective in stimulating interest and in developing fluency in expression as definite assistance in acquiring full and accurate meanings.²⁰

Aiding pupils in the development of meaningful vocabularies must not be confused with having them memorize definitions, which is usually just another form of verbalism. Technical terms need to be fortified by experimental material, or based upon a sufficient amount of pertinent detail, if they are to be understood. One of the best means of determining whether students understand special vocabulary is to have them provide their own illustrations or to see whether they can use the terms appropriately in new situations.

Means of Extending and Enriching Experience. Throughout our entire discussion on the nature of meaning and the development of understanding, we have constantly emphasized the importance of extending, enriching, and deepening the individual's experience. How can the school accomplish this purpose?

One of the first steps should be to exploit the local environment to the fullest possible extent. Nature study, general science, biology, and physical science are usually too bookish as they are now taught. The woods, streams, rocks, farm lands, and natural phenomena of all kinds are laboratories as essential as the formal laboratory and classroom. The local environment is also an important means of understanding historical events and trends. "The community," it has been said, "is an epitome of the world, and an understanding of it is the best preparation and the strongest assurance of an understanding of wider scenes."²¹ The school journey or the excursions, thus becomes

one of the most useful learning activities. Other means of providing concrete experience are found in projects, or "constructive activities," which are attempts to create realistic representations of things read about, and to provide an experiential basis for later learning situations. Assembling classroom or school museums, using public museums, and arranging exhibits in connection with instructional units provide additional opportunities for extending experience.

Visual Aids as a Means of Enriching Experience. One of the most promising ways to supplement the pupil's experience and the resources of the immediate environment is to utilize the great variety of visual aids which are available. The phrase "to supplement" in the previous sentence was used advisedly, for these media of instruction are not *substitutes* for verbal materials, but means of making them more effective. In fact, these devices are likely not to be productive when they stand alone, but only as they are closely integrated with other media and with other learning activities. The use of motion pictures is increasing rapidly in the schools, but they are too often treated as "shows" and not as efficient means to well-defined learning outcomes.

Visual aids include pictures, drawings, photographs, prints, stereographs, lantern slides, animated drawings, silent and sound motion pictures, maps, globes, charts, graphs, diagrams, models, and perhaps even other devices. Care must be exercised in employing these aids, for their effectiveness often depends on specific instruction in their use. Furthermore, one's ability to profit from visual aids, as from verbal stimuli, also depends on a relevant background of experience. Several college students, for example, missed the point when a stock ticker crashed in the motion picture, "The Plow That Broke the Plains." They did not know what the machine was, and so failed to sense that it symbolized the breakup of the expanding economy which had caused man to turn the great plains into wheat fields.

There are two fundamental criteria for the selection or preparation of all types of visual materials. First, they must

provide an *accurate* representation of reality or they will simply lead the individual to acquire hazy or incorrect meanings. Second, they must be used as means, and not as ends in themselves; in other words, they are visual *aids*.

Motion pictures, when chosen because they are directly relevant to the purposes of instruction, are especially effective means of making learning experiences realistic. Their contribution to the development of meanings has been well summarized in the following general statements of the results of experimental studies:

1. Motion pictures, like other pictures but to a superior degree, contribute materially to the accuracy, the richness, and the significance of students' concepts. This is particularly true of descriptive aspects. Places, people, events, and processes are made to seem more real.

2. As a consequence, thinking is made more effective, empty verbalism reduced, vocabulary increased, and language made more meaningful. . . .

3. Children who are lacking in imagination, low in intelligence, or below the average in reading ability, are helped especially.²²

Furthermore, motion pictures have proved to be particularly worth-while where knowledge of movement is essential, or where an understanding of relationships is important. In an extensive series of experiments on the contribution of motion pictures to historical learning, the photoplay proved so efficient in teaching a knowledge of interrelationships involving the interaction of events and forces that it increased pupils' achievement about 35 per cent over purely verbal instructional materials.²³

ABSTRACTION AND GENERALIZATION

The Process of Generalization. Abstract or general ideas have been referred to several times in this treatment of the problem of meaning. What is the nature of a general idea, and how does the process of generalizing take place? If, in thinking or communicating ideas, we had always to refer to specific objects, events, situations, and relationships, or to a large num-

ber of such particular instances which we wished to include, the process would be extremely cumbersome. It is fortunate, therefore, that man is capable of *classifying* his experiences, and using one word or a group of verbal symbols to represent many items or certain essential aspects of many related events. Thus it is convenient and efficient to speak of "education" rather than to enumerate all the results and processes of learning. Furthermore, it is by *ordering* our experiences that they become most meaningful and useful. We have repeatedly stressed the importance of experience as a background for meaning, but the mere accumulation of experiences is of doubtful value. It is by *relating and organizing* our experiences that they become most significant. This involves the tremendously important human ability of thinking about many qualities or characteristics of things in settings other than those in which they were originally perceived. We can come to think of the quality of roundness, area, or honesty without considering all the concrete situations in which these qualities have been previously observed. Generalizations also help us to carry over our understanding from old to new situations. The classification and organization of experience enable us to *interpret* new events by relating them to previous meanings. Thus when we are able to classify a particular sort of animal we have not seen before as a dog, we know how to react appropriately to it. Developing general ideas, then, is one of the most important aims of education.

Illustrations of Abstractions. Inasmuch as one of the important tasks of education is the development of abstract ideas, and inasmuch as such ideas are most important materials of thought, it will be advisable to ascertain as fully as possible the principles involved in such learning. In arithmetic, one, two, and other numbers; sum, difference, remainder, product, and average; addition, subtraction, division, and multiplication; percentage, discount, interest, profit; length, width, height, area, and volume are not real objects in the ordinary sense, but aspects or relations which may appear in countless different situations. In other subjects we encounter such concepts as

noun, verb, subject, predicate, object; soft, hard, big, little; triangle, circle, square; above, beside, without; north, south; if, why, how, nevertheless. Honesty, fairness, right, wrong, sympathy, liberty, justice, government, law, order—these are facts which do not exist in the child's experience until ideas of them are laboriously acquired. Two well-known studies of the process of generalization throw considerable light on this complex form of behavior.

Experimental Studies of Generalizing. The first experiment was designed to verify the assumption that generalization takes place by identifying the element which is common to a variety of specific situations, and supplying a name for this general term or concept. Chinese characters were used. These notations (which are illustrated in Fig. 16) are really combinations of smaller figures called radicals. The same radical was combined with a variety of other elements, and the subject's task was to learn to apply a given term (in this case a nonsense syllable) to all characters which had a common radical. The characters were presented to the adult subjects in different ways in order to study certain factors associated with the process of generalizing. The results showed, first, that there was a definite advantage in presenting the common element first in relatively simple settings, and then going on to the more complex combinations. This finding suggests that, for purposes of initial instruction, one should select total situations in which the particular aspect to be abstracted is as obtrusive as possible, and encumbered by as few irrelevant details as possible.

The second conclusion was that reasonable familiarity with many concrete cases is better than intensive work with a few. This result emphasizes the principle that a clean-cut abstract idea is usually achieved only as the outcome of wide experience. Children may learn to act in a kindly or honest manner in a relatively small number of situations, or to add to or use the number two on several occasions, without really acquiring the abstract idea involved. The following definitions, given by children of twelve or above, illustrate inadequate notions of the real meaning of *justice*. "It means a court"; it's the Court

House"; "it means to have peace"; "to be kind"; "to be honest"; "to do right"; "to get punished." When children have such ideas as: "to multiply always means to make bigger"; "weight is what is in things to make them fall"; "adverbs are what end in -ly"—the process of generalizing has obviously been incomplete.

To provide the proper conditions for abstracting a character, it is necessary to present a large number of different situa-

	WORD CONCEPT	PACK I	PACK II	PACK III	PACK IV	PACK V	PACK VI
oo	丿	津	沛	泳	滄	決	添
yer	殳	殂	殂	殂	殂	殂	殂
li	力	勛	勛	勛	勛	勛	勢
ta	弓	弧	弧	弓	弗	馳	野
deg	石	書	砗	角	磐	磐	磨
ling	宀	宀	宀	宀	宀	寢	寢

FIG. 16. SOME OF THE CHINESE CHARACTERS USED IN HULL'S EXPERIMENT ON THE DEVELOPMENT OF CONCEPTS

Note that a nonsense name is given to each radical (basic concept) on the left. Then each character to the right contains the basic radical in some form. The subjects learned to call each character by the name of the basic radical which it contained. (From Woodworth, *Experimental Psychology*, Henry Holt & Co., 1938, after Hull.)

tions which contain it. When the abstract quality is given in but one situation, or but few situations, it is likely to remain attached to these particular situations. A mother had attempted to teach her child the meaning of "square" by presenting the top of a box which was displayed while the word "square" was repeated and explained. When the father was told of the lesson,

he held up a paper, asking, "What is this?" "A paper," was the response. "Yes, but what kind of a paper?" "A white paper," etc. No effects of the lesson could be secured by the use of cards and other objects, but when directly asked "What is a square?" the child ran to the box, exclaiming proudly, "That is a square." Squareness had not been abstracted. It was not known as such but only rather vaguely as a feature of the box situation. To develop an idea of squareness, one must show the child many different gross totals which contain it, such as a square card, a square desk, a square block, a square board, drawing, picture, etc.

The data of the experiment with Chinese characters also showed that there was no advantage in presenting the element in isolation. Recognizing one of the radicals alone was no assurance that it would be recognized in a complex Chinese character. In other words, although the first presentation should be in a simple setting so that the essential aspect stands out clearly, learning should take place from the beginning in a realistic context.

The results also indicated that a reasonable length of time is necessary for the generalization to emerge. In some instances, as suggested by concept II in Fig. 17, the evolution of the concept was gradual. In others, the generalization was made rather suddenly after a somewhat extended initial plateau. The latter curves are suggestive of the learning processes in which the individual suddenly gets insight, "sees into the situation."

Finally, this study agrees with many others in revealing that one can form a generalization without being able to verbalize it. Evidence that the concept has been made comes from the consistent appropriate behavior of the individual in successive test situations. One illustration of un verbalized generalizations is the way in which children come to express the sense of past time by consistently using the "ed" form of the verb. They characteristically express past tense by casting verbs never used before into the regular form.²⁴

The second experiment was designed on the assumption that the common properties of situations which form the basis

of a general idea are not specific elements, but relationships. The definition of concept formation implicit in this study was the following one: "By 'concept formation,' 'generalization,' or 'concept learning,' we refer to the process whereby an organism develops a symbolic process (usually but not necessarily linguistic) which is made to the members of a class of stimulus *patterns* but not to other stimuli." (The italics are the writer's.)

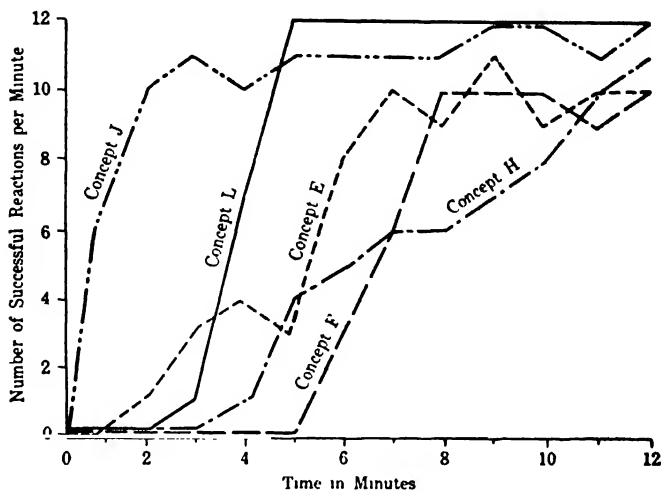


FIG. 17. CURVES OF LEARNING FOR THE ACQUISITION OF FIVE CONCEPTS

These curves, like those for skills, show different shapes. (From C. L. Hull, *Quantitative Aspects of the Evolution of Concepts*, Psychological Monographs, 1920)

The materials of the experiment were geometrical figures which differed in color, shape, size, or position, but which contained some common relationship. The problem was to attach a nonsense term to all figures that possessed the same pattern. Thus, "dax" was the name of any figure that contained a circle with one dot inside and one dot outside. A figure that contained a circle with both dots inside had to be distinguished from the appropriate "dax" characters.

This experiment also provided evidence that un verbalized but functioning generalizations may be formed. Negative in-

stances—figures marked with a minus sign to indicate they did not contain the proper relationship—did not prove useful in guiding generalization. Finally, the process of developing a general idea was an active one. It involved the formation of tentative hypotheses, the testing of these inferences, and the revision of the hypothetical principles until they satisfied the necessary specific instances.²⁵

Generalizing an Active Process. This last finding suggests that an important principle of guidance in generalizing is to induce pupils to react vigorously. You will recall that in Chapter XII we found that, in learning a poem or other material, the rate of learning and the character and amount of retention were improved by introducing actual recall ("recitation") as soon as some of the material could be revived without too many errors. The same principle applies to the acquisition of abstract facts. It is very important that the pupil be given experience not merely in perceiving the elements as the teacher presents and emphasizes them but also in discovering them for himself. The pupil will learn to identify a subtle fact or relation in new situations better by being guided into taking the self-active attitude of exploration and discovery than by being permitted continually to sit and be shown. Thus if the problem is to achieve ability to appreciate such concepts as squareness, weight, fourness, liberty, etc., the pupil should meet many different novel situations, problems, and projects which make the discovery of the essential factor a means to the solution of the problem or the carrying out of some purpose or project. A definite set has been found experimentally to facilitate the formation of concepts.²⁶

Ideas Defined by Using Them. It is by using an idea that it becomes more definite. The child's idea of a dog, for example, is constantly undergoing change and development. The child at first perceives the animal and proceeds to deal with it much as he would with other objects with which he is familiar. He observes legs somewhat like those of his toy chair, and when he seizes a leg by which to carry the puppy about, the child's idea is modified by the painful consequences. If the child

squeezes the puppy too affectionately, as he might a stuffed animal, the yelp or possibly a snap results in a revision of the old way of perceiving the pup to take account of new factors. The dog, in the course of time, is perceived and thought of as an object with sharp teeth, a certain weight, strength, and agility, a thing that mustn't be stepped on or immersed in water, which barks at birds, snaps when disturbed in feeding, and never talks, but is generally a playful companion. Thus the child's idea of a dog is a changing, growing complex of particulars.

Analysis and Combination in Acquiring an Idea. In the development of percepts and ideas, two processes are going on simultaneously. The complex object is, on the one hand, analyzed; the subtle features are perceived. Details of the dog's appearance and behavior are noticed. The shape of the pup's ears, the number of toes, the significance of slightly different whines and barks, the characteristics of its fears and angers are observed more and more specifically. Perception of the dog, and consequently thinking about it, becomes progressively more detailed and refined. At the same time, a process of synthesis or reorganization is apparent. Perception and thinking become not only more refined, but also more broad and inclusive; they reach higher and more complex integrations. The minute facts become *organized* into unified percepts and ideas more rich and comprehensive. Analysis and synthesis—that is, addition, subtraction, and integration of elementary facts—go on simultaneously and continuously. The idea is a constantly growing complex of integrated particulars. It occurs as a single response, but a great many facts may be implied in the reaction.

In like fashion, concepts or general ideas develop by the process of analysis and synthesis. Refinement of general meanings proceeds at times by eliminating certain things from a class or group on the basis of their discriminated characteristics. But development also takes place by making a symbol represent more things—included because of their common essential details or relations. Thus the concept of "dog" changes as other animals, at first included under the term, are differentiated

from dogs. It also develops as other kinds of dogs than those originally included are brought under the class name. Meanings thus change by complementary processes of restriction and expansion. Neither aspect of development could take place without the differentiation of gross situations and responses into more detailed patterns. This more detailed and accurate discrimination and the processes of restriction and expansion occur to the extent to which they become essential or worthwhile to the individual in attaining his purposes.²⁷

Dangers in Use of Abstract Ideas. Abstraction and generalization are useful and essential means of thinking and of conveying ideas. But they are also sources of confusion. General ideas are valuable or meaningful only to the extent that one can at any time refer back to the specific situations from which the generalization was made. Unless these referents, or equally relevant ones, can be identified, we are likely to indulge in word magic. Words are "tags," and we should be conscious of what any label represents.

Such words as "communism," "freedom," and "Jew" are often used, not to convey meanings clearly, but to evoke *emotional* responses. The purpose of doing so frequently is to block intellectual apprehension rather than to stimulate it. It is particularly important in teaching students to interpret spoken and written discourse to train them to detect language used to arouse emotion and react accordingly. This means, for one thing, to recognize instances, in literature for example, where the affective function of language is desirable, and other cases, such as discussion of public affairs, that call for reasoned understanding, where emotional stimuli are likely to forestall rational consideration.

Curves of Learning for Ideas. The fact, pointed out first in Chapter VI, that ideas and concepts are acquired by a process of growth should now be clear. The growth in understanding of certain geographic terms from grades four to seven is presented graphically in Fig. 18.²⁸ These curves are based upon averages, and hence are smoother than individual growth curves would be. All of the terms represented in the graph

occurred in the textbook material studied in all four grades, so that all of the children had had some opportunity to learn their meanings. The growth patterns of the different terms varied considerably.

The process of development of many abstract ideas requires several years. An average child of three or four can correctly perceive a large number of objects such as a cup, knife, penny, shoe, automobile, airplane, and pitcher, but he is usually five

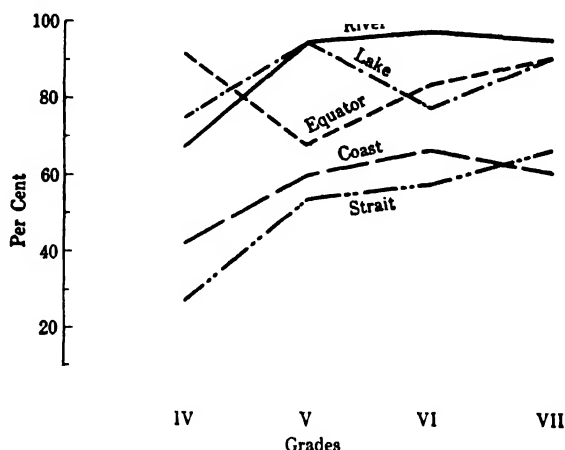


FIG. 18 GROWTH IN UNDERSTANDING OF GEOGRAPHICAL TERMS

These growth curves are based on the average percentage of correct responses given by children to the five terms: *coast*, *equator*, *lake*, *river*, and *strait* (From Eskjude, *Growth in Understanding of Geographic Terms in Grades IV to VII*, Duke University Press, 1939)

before he can count four objects correctly. He is seven before he can explain how wood and coal are alike. Not until eight does he realize the meaning of, or take much interest in, abstract similarities and differences, such as the difference between a baseball and an orange, or an ocean and a river. Not until twelve is the child able to define such abstract words as "constant" "charity," "courage," "defend." Previous to this year, the average child may have been taught to express pity and to act charitably, but the idea will not have been thoroughly ab-

stracted. He may, too, have been taught verbal definitions of some of these terms without really having the idea in abstract form.

SUMMARY

This chapter was devoted to one of the problems in educational psychology of greatest significance in education, that of how meanings develop in the course of learning, and how we derive meanings from verbal symbols. The main points of the discussion may be summarized as follows:

1. Teachers should distinguish between real comprehension and empty verbalism—the memorization of verbal statements without understanding. It is essential to probe behind the words which students use to discover what they mean by them. These meanings may be vague, incomplete, inaccurate, or completely wrong.

2. Meaning depends in the last analysis upon experience. Words mean to anyone what they represent in his experience.

3. Comprehending a passage, however, is not only the process of recalling experiences that are related to the verbal symbols. It also demands an active process of selecting the most pertinent meanings and organizing them adequately with respect to the structure of the discourse and the purposes of the reader.

4. Meaning depends in considerable degree upon context, or upon the relationships of language forms and of ideas. One way to make experience more meaningful is to organize it systematically and purposefully.

5. One means of getting meaning from spoken or written discourse is to identify the *referents* of the verbal symbols, that is, to determine what situations they are used to represent.

6. There are several ways in which meanings may be improved or clarified.

- a. Most textbooks burden the student with an excessive vocabulary load. It is essential to develop technical terms systematically and to review or use them meaningfully in a variety of purposeful activities. In some instances, simplifying the vocabu-

lary of a selection may aid comprehension. In other cases, however, simplification may be of limited assistance because the real difficulty may lie in the inherent complexity of the ideas being presented.

b. The fundamental means of stimulating understanding is to enrich the individual's experience and to provide purposeful opportunities for him to use and to interpret language relevant to this experiential background. Some of the fruitful ways of extending experience are (1) to utilize the local environment; (2) to supplement immediate experience and the resources of the local environment by extensive reading and by visual aids, such as motion pictures, charts, maps, slides, and demonstrations; and (3) to organize projects and other constructive activities as a means of attaining well-defined educational outcomes.

7. Generalizing is the process of identifying the common aspects or basic relationships in a variety of specific situations. Generalizing validly is an active process of exploration, discovery, and utilization, and ordinarily necessitates a large amount of experience. General ideas are not acquired ready-made, but are the result of a growth process. Concepts grow in richness, accuracy, and usefulness in the course of purposeful experiences.

QUESTIONS AND EXERCISES

1. Trace your idea of the significance of the word "psychology" during this course. In what respects is the development similar to and different from that of the child as he becomes acquainted with his dog?
2. Discuss the possible derived meanings, the symbolism, behind certain customs of dress and grooming such as:
 - a. Saddle shoes and ankle sox in winter.
 - b. Excessively long fingernails as worn by men in China and to some extent by women in our country.
 - c. Light, fluffy, elaborate evening dresses for women.
 - d. Suit coats for men in offices and at meals no matter what the temperature.
3. Consider the case of a child who is deaf from birth. How would you teach such a child to read and understand such words as "eyes," "cold," "mother," "under," "his," "pretty," "swim"?

4. Make a diagram to show how a child comes to recognize the word "doll" as representing the known object. Look up the term "conditioning" or "conditioned response" in some other elementary psychology book. How does the term "conditioning" differ from the phrase "establish the belonging" used in this chapter?
5. Suggest two expressions, other than those cited in the text, which could not be understood completely by children from your home district. Why would understanding be difficult?
6. Leaf through this chapter and list the words that are not familiar to you in the particular context in which you find them. On the basis of this limited survey estimate the number of new words or new meanings you would have to learn each day in order to master all of the material of your various courses.
7. How would you teach first-grade children to recognize and know the significance of the suffixes "-ing," "-ed," "-s," and "-er"?
8. Write five sentences to inform a southern Indian child through context what velvet is. What firsthand experiences have you had to assume? List and justify your assumptions.
9. Criticize the teaching of concepts or principles in history, geography, physics, geometry, or some other subject as it was taught to you or as you have recently observed it being taught.
10. Recall a recent argument which you heard or in which you participated. State the subject and outline the progress of the discussion. Identify the "referents." Was there an essential disagreement? Specify.
11. Illustrate the statement that there are always limits to the degree to which facts are generalized or understood.
12. Cite an instance from your own experience of the use of movies in the school program. Was the picture closely linked to a learning project? Was it purely entertainment? What are the advantages and disadvantages of using movies in this manner?
13. Try an experiment in incidental learning. Take five white cards and on each trace one circle, the exact size of one of the five common coins; penny, nickel, dime, quarter, and half-dollar. Present these in random order and ask a classmate to guess the coin represented. Keep a record of his guesses. Try this on several classmates and summarize the results. What conclusions can you draw?

14. The comment has been made that our calendar would have been reformed long ago if someone had not invented the jingle, "Thirty days hath September." Do you agree? Why?
15. Give some examples from your own experience of the use of artificial associations to create "meaning" and hence to aid memory. Is this procedure justified? Under what circumstances would you urge children to use such a device?
16. Select some word which is used much in modern controversy, such as fascist, radical, or isolationist. Make a collection of the meanings, the "referents," as it is used in current discussions or writings.
17. What methods would you use to enrich the experience of a group of third-grade city children before you had them begin a farm reading unit?
18. Look at the following list of nonsense syllables:
mup, wal, lub, seg, ym, taz, bip, lei, ron, pij
Are they truly "nonsense" to you or do you attach some sort of meaning to each as you read them? What then is the difference between this sort of material, which is often used in laboratory studies of learning and memory, and the meaningful materials of the daily school program?

GENERAL REFERENCES

For a more comprehensive treatment of the significance of language, see

- Hayakawa, S. I., *Language in Action*, Harcourt, Brace & Co., 1941.
Emphasis on language as a tool for social participation and personal and cultural adjustment is made in the following works: LaBrant, L., "The Relations of Language and Speech Acquisitions to Personality Development," Ch. 12 in C. E. Skinner and P. A. Witt (editors), *Mental Hygiene in Modern Education*, Farrar and Rinehart, 1939.
Language in General Education, Commission on Secondary School Curriculum of the Progressive Education Association, Appleton-Century Co., 1940, Ch. 1, 4.

For a systematic discussion of the problem of developing meanings from the point of view of the educational psychologist, see

CHAPTER XIV



REASONING AND PROBLEM SOLVING

The most complex form of adjustment of which human beings are capable is reasoning. Reasoning is *productive thinking* in which previous experiences are reorganized, or combined in new ways, to solve a problem.¹ Reasoning is then a tool for problem solving and, at the same time, is a form of learning which involves (1) the selection of past experience, or the systematic search for new information that is relevant to the goal, (2) the perception of relations, and (3) the purposeful adaptation of means to ends. It is a process which is characterized by *understanding* or *insight*. The ability to reason is closely related to intelligence. It becomes pertinent, then, to find out how the ability to reason develops, and whether it can be improved by systematic training.

THE NATURE AND DEVELOPMENT OF REASONING ABILITY

Variation in Reasoning Ability. First, however, it is important to ask whether everyone is capable of reasoning, in some degree at least, or whether some individuals are entirely incapable of rational behavior. The evidence shows that variation in reasoning ability is continuous, as it has proved to be in other psychological traits. In other words, there is no point that divides the people who can reason from those who cannot. Differences in reasoning ability are differences in degree. Some individuals can solve more difficult problems than others can manage; some can solve more problems in a given length of time; some are less susceptible to prejudice and emotional impulse; some are more limited in certain fields because they do not possess special aptitudes in sufficient degree or because

their experience in these fields is meager; some are less efficient, too, because they have not developed a sufficiently flexible method of attack upon problems or because they have not learned how to work effectively. Investigation of all these aspects of problem-solving ability shows that human beings vary in these characteristics in terms of more or less instead of in terms of all or none.

Reasoning Efficiency Improved by Systematic Training.

It has sometimes been asserted that problem-solving ability develops instinctively, and that training in reasoning is therefore either unnecessary or impotent. In other words, it has been assumed that some individuals grow naturally into good problem solvers, while others are not endowed with much capacity for thinking, and there is nothing that education can do about it. It is true, of course, that problem-solving ability is greatly dependent upon native endowment, and that no amount or quality of education could stimulate intellectual attainments beyond a certain limit. But there is good reason to believe that few of us fully utilize our native capacity for learning. The fact that we ordinarily fall short of potential achievement is revealed in many studies of improvement under desirable conditions of practice and motivation. There is good ground for believing that few persons learn to reason most rigorously and effectively without systematic training in the process and a great deal of active experience in solving or attempting to solve problems. High proficiency in reflective thinking does not appear by magic—not even the magic of inheritance alone.

Ability to Reason Develops Gradually. It was once believed that the reasoning powers develop late and rather suddenly. This concept of mental development was based upon the assumption that the child's capacities to acquire specific skills and to memorize particular items of information develop first, and that only after these powers come to fruition is the child capable of reasoning. This doctrine was much more general a decade or two ago than it is now, although it has not disappeared by any means, and it was probably in considerable part responsible for making the elementary school a "drill

school" and for deferring the exercise of higher mental processes until the secondary school period.

The evidence, however, indicates that children—even pre-school children—can reason. Investigations have shown that children as young as three years can discover a principle and apply it to new situations. Five-year-old children have been able to construct a route to the goal in a maze problem by integrating two isolated experiences.² Competence in problem solving increases gradually with age. Older children can solve more complex problems, state their conclusions in better language, and formulate the reasons for their solutions more cogently. Adults can perform these operations even more effectively. But although young children are limited by immaturity both in inner growth and in experience, they are capable of rational behavior on their own level. In fact, if allowances are made for differences in knowledge, experience, and language development, it appears that children and adults reason in essentially the same fashion. The errors which young subjects make are not different in kind from those which adults exhibit when they meet very unfamiliar situations.³

We may conclude, then, that the ability to reason, including the ability to discover relationships and to use previous experience in meeting new situations, develops gradually. This suggests that there should be no level of education where learning is exclusively devoted to the acquisition of facts or entirely given over to reflective thinking. The two processes should develop together. It is becoming common to see intermediate grade children in the modern elementary school start with a significant question; search for relevant facts in several sources; evaluate the authoritative adequacy of these sources; organize their information; and bring the facts to bear upon their problem. This is the kind of activity which elementary schools should increase by large amounts, provided the situations can be made meaningful and useful to children at the time.

Difficulties in Improving Reasoning Ability. It is admittedly difficult to learn how to think; the person who acquires the ability must do it through hard work. It is true, too, that psy-

chologists have discovered all too little about the higher thought processes and their education. This lack of evidence on the nature of reasoning and the improvement of problem solving makes it difficult for the teacher to guide pupils in the development of critical thinking. But in spite of the lack of scientific data and the difficulty of learning and teaching how to think, there are at least common-sense approaches to the improvement of reasoning which give promise of value. Before discussing these procedures, however, we should define problem solving more explicitly, and explore the data on the nature of reasoning which are available in the psychological literature.

THE CHARACTERISTICS OF PROBLEM SOLVING

What Is a Problem? A problem exists for an individual when he has a definite goal that he cannot reach by the behavior patterns which he already has available. Problem solving occurs when there is an obstruction of some sort to the attainment of an objective. If the path to the goal is straight and open, there is no problem.⁴ It is when one has to discover a means of circumventing an obstacle that the stage is set for reasoning. In arriving at a solution of the situation, it is necessary to select out of previous experiences those which are particularly relevant to the present task, and to organize these phases of previous learning into a new pattern of response. We can say, then, that the process of problem solving in its most direct and effective form has the following features: (1) it is directed by the goal and a perception of the essential relationships in the situation; (2) it is selective, for one of the keys to successful solution is the ability to recall relevant experiences; (3) it is insightful, for it involves the reorganization of relevant experiences into a complete solution, with particular reference to means-end relations; (4) it is creative, for it results in an essentially new construct—a reorganization of ideas or movements or both; and (5) it is critical, for it is necessary to evaluate the adequacy of hypotheses or tentative solutions.

Reasoning and Problem Solving as Forms of Learning. Reasoning has sometimes been distinguished from learning.

However, this differentiation is not valid unless learning is defined as the acquisition of specific associations in which the element of discovery of the appropriate response is at a minimum. Actually, as we have pointed out previously, learning situations differ greatly in the amount of discovery which is necessary. We may think of these differences as being arranged along a continuum. At one end of the scale we would locate what is known as rote learning, one example of which is the memorization of a list of nonsense syllables. Another example is the traditional experiment on conditioning, in which a certain situation is connected with a certain response, not because of any intrinsic relationship between the two, but merely because the two occur together. Whenever the teacher identifies the situation for the pupil, prescribes the response, and directs him to repeat them together, the classroom introduces learning tasks in which discovery is certainly an inconspicuous feature.

Types of Reasoning and Problem Solving. Farther along the scale are the learning activities in which the teacher explains the reasons for a conclusion with the purpose, not of having the pupil discover them entirely by himself, but of having him understand the relationships which are presented. Thus a teacher of economics might explain why the financing of a greatly expanded defense program through high taxation and the sale of bonds to private investors rather than banks would tend to retard inflation. Much of our learning must necessarily take the form of understanding relationships that scholars have discovered. One of the purposes of education is to profit from the experiences of others instead of having to learn everything at first hand. However, there is a considerable element of discovery in comprehending what others have learned. The process of getting the meaning of an expository account is itself an example of problem solving. But merely understanding the results of the thought processes of others will not suffice to teach the pupil himself how to reason effectively. We must give him the opportunity to think for himself.

At the other extreme on the discovery scale are those situations in which the individual, though perhaps given certain

leads or cues, must find the solution for himself. This means that he will have to explore the problem extensively in order to define it explicitly; search systematically for previous experience which may aid in the solution; locate additional essential information; formulate possible solutions; and determine whether these hypotheses will actually satisfy the demands of the problem.

Examples of Teaching Planned to Improve Reasoning. A fuller understanding of the nature of reflective thinking has caused many changes in educational procedures. We found out that merely memorizing the proofs of theorems in geometry did not teach students to solve new problems independently in geometry itself, much less in other fields. As a result, textbooks in geometry now seldom set forth a complete proof, but leave many parts to be filled in by the learner, and put much more emphasis on the solution of "originals" and of practical problems. Instead of having students simply learn the contents of a text in history or social problems, there is now a tendency to ask them questions which can be answered by using the material in the text and in other sources but not by quoting or paraphrasing the statements in the books. Laboratory work in science, which too often has consisted mainly of following a manual of directions in routine manner, is now more likely to consist of real problems, many of them of practical value, which provide experience in the scientific procedures of observing, recording, and interpreting results which have not already been outlined in the textbook or manual.

ACTIVITIES INVOLVED IN REASONING AND PROBLEM SOLVING

Relatively few psychological investigations of the actual process of problem solving or reasoning have been made. A good many of those which are available have to do with the solution of puzzles rather than with the forms of understanding and reasoning which should constitute the major portion of school work. The best interpretation of the experimental work has been made by Woodworth, and we shall take advantage

of his treatment.⁵ The most comprehensive logical analysis of "a complete act of thought" has been made by Dewey.⁶ It has been said that Dewey has not described how we actually think but how we should think. In any event, his discussion is extremely valuable, and it will be profitable to combine the results of scientific investigation and logical analysis.

BECOMING AWARE OF THE PROBLEM

Reasoning Begins with a Felt Difficulty. Dewey has emphasized the fact that a problem is a *felt* difficulty. There are obviously all kinds of problems about us of which we are unaware. Furthermore, we may be more or less conscious of the existence of important problems but take little interest in them because they do not appear to be related to our own needs, welfare, or intentions. It is true, too, that what is a problem for one person may be little more than a routine matter for another. Problems arise for an individual when he encounters some obstacle to the satisfaction of *his* wants or the attainment of *his* goals. One of the reasons why the school is often ineffective in stimulating an aggressive attack upon "problems" or in teaching methods of problem solving is that the difficulties it creates for pupils are little more than assigned tasks to be learned in routine fashion.

Awareness of Problems Depends upon Experience. The number of problems of which we are aware and the seriousness with which we respond to them are determined in considerable part by the extent of our information and experience in given fields. The complexity of the farmer's problems is seldom appreciated by the urban dweller who knows little about the hazards of climate, the constitution and depletion of soils, the raising of live stock, and the immediate and remote factors which determine the balance of profit or loss. The businessman who has only a few employees may know very little about the labor problems of a firm with a large personnel. Any one person may little realize how his own welfare depends upon the well-being of others, and therefore be unconcerned about the problems other people face. The more one knows about any

subject, the more numerous the problems in it become. This suggests, first of all, that sensitiveness to problems can be stimulated by extending the individual's experience. The school has the responsibility for doing this directly through a wide range of purposeful activities and vicariously by extensive reading.

Helping the Pupil "Feel" a Problem. The dependence of problem-awareness upon experience also suggests the importance of relating pupils' work in literature, science, social studies, and other fields to their own and their parents' activities and to the life of the community. Active inquiry comes with thinking about one's own problems, not the teacher's. If the teacher wants the pupil to work on the problems he considers important, he must somehow get the pupil to make them his own. A college instructor in political science who had failed to get his class interested in the general problem of the extent of government control over the individual got a useful cue for changing his approach from a student who stopped after class to ask questions about his rights and duties under compulsory military training and service. The instructor used this situation as a means of raising the issues contained in the general problem, and stimulated an entirely different response from the class.

Dewey has stressed the subjective character of the problem situation in the following passage:

. . . the origin of thinking is some perplexity, confusion, or doubt. Thinking is not a case of spontaneous combustion; it does not occur just on "general principles." There is something that occasions and evokes it. General appeals to a child (or to a grown-up) to think, irrespective of the existence in his own experience of some difficulty that troubles him and disturbs his equilibrium, are as futile as advice to lift himself by his boot-straps.⁷

DEFINING THE PROBLEM

First Step in Defining the Problem. Success in problem solving depends in no small degree upon the extent to which one can recall from all that he has previously learned what conceivably might be useful in the novel situation. What are

the factors which determine whether he will be successful in calling up these experiences? First of all, he must take an active attitude toward the problem, make a deliberate effort to recall relevant facts. Second, perception of the essential features of the problem provides the stimulus for the recall of previous experience. If one has only a vague notion of what the situation is all about, his ideas are not likely to be very prolific. If, on the other hand, he explores and examines the problem until he knows what is asked for and what is given, this knowledge of the situation may evoke a larger number of useful suggestions and also more pertinent ones.

Woodworth quotes Helmholtz, who made many contributions to the sciences of psychology, physiology, and physics, on how thoroughly he familiarized himself with the problems he was working on. To formulate fruitful hypotheses, Helmholtz said that "it was always necessary, first of all, that I should have turned my problem over on all sides to such an extent that I had all its angles and complexities 'in my head' and could run through them freely without writing."⁸

The Selective Character of Problem Solving. Problem-solving behavior is always selective. First of all the understanding of the task at hand determines what is remembered from similar occasions or what attempts at solution are made. Second, the more accurately and completely the problem is defined, the better criteria the learner has for evaluating the appropriateness of the responses he makes to the situation or the ideas which he brings to bear upon it. If his automobile stops, he will consider one set of factors if he thinks the difficulty is with the ignition, and another if he thinks the trouble is in the carburetor. It doesn't help the teacher a great deal merely to know that a child is having trouble in learning to read. Only by determining diagnostically the child's specific difficulties is it possible to know what data to collect on the case and how to proceed in remediation.

Keeping to the Problem. The importance of defining the problem fully and exactly is illustrated by the fact that one of

the best ways to beat an opponent in an argument is to get him off the track. In the formal debates which were once so popular in schools and colleges, one of the common stratagems was to try to confuse the issue and get the opposing side to spend its time on irrelevant or unimportant questions. The only way to conduct a good discussion or argument is to speak directly to the problem. It is instructive to note how far a discussion often wanders from the subject with which it began. Rambling comments only befog the principal issues and obstruct group thinking. This is why a good chairman brings the discussants back to the main points when they are prone to wander. For the same reason, the teacher often leads a pupil back to the problem by asking, "What was the question you were asked?" or "What was the topic you were to discuss?"

Many teachers who attempt to use the "problem method" are not successful because they present very broad issues which are so complex that students cannot devise a plan for working on them systematically. It would be relatively futile, for example, to ask students to explain what causes inflation without helping them first to determine the principal aspects of the problem. Questions as to what forms inflation may take, what effect the amount of production of consumer goods would have, what the influence of rising employment and wages would be, what effect government borrowing through the banks would have, and many more would need to be considered in defining the problem sufficiently to make study and reflection fruitful. Time devoted to laying out the field of the problem thoroughly is not wasted.

LOCATING, EVALUATING, AND ORGANIZING INFORMATION

The Importance of Collecting Sufficient Data. To provide the basis for formulating hypotheses, or tentative solutions of a problem, it is sometimes sufficient to assemble the information one already possesses. Usually, however, difficult situations call for the collection of new data. The solution of a problem can be no better than the facts upon which it is based. It is

probable that errors in thinking are due more to lack of sufficient data than to any other one cause. These difficulties are illustrated in our endeavor to deal with social issues.

The problems which society faces today are so complex that an enormous amount of information is necessary for intelligent consideration of social, economic, and political issues. The number of citizens who possess the necessary information for making sound judgments on public affairs is probably distressingly small. It is possible, for that matter, that legislators themselves often vote on crucial issues without adequate factual analysis. Horn is undoubtedly right when he declares that "with respect to accurate knowledge, the public mind appears to be sadly undernourished."⁹ He goes so far as to conclude, from studies of what students and adults know, that "(a) the average individual does not now have a sufficient background of accurate information to think effectively about modern problems; (b) that he does not know the sources of dependable information; and (c) that he could not read these sources with understanding even if he found them."¹⁰

Cultivating Respect for Accuracy and Thoroughness of Evidence. The danger of having students "solve" difficult problems is that it is easy to encourage superficial thinking. In many instances, the essential purpose of education may be to impress students with the complexity of contemporary issues. In any event, the school has no excuse for encouraging or tolerating ill-considered statements, half-baked conclusions, or willingness to generalize without the necessary data. Teachers should attempt to inculcate respect for evidence, an attitude of thoroughness in searching for facts instead of a tendency to be content with insufficient and inaccurate information, a critical but constructive attitude, and an effort to avoid prejudice.

The Need for Thorough Exploration and Organization of Facts. One often runs across the notion that the creative mind does not need a great amount of information, but gets its insights through some magical, intuitional process. But the evidence and the testimony are very much to the contrary. Inquiry into the methods of work of chemists and inventors has shown

that scientists actually assemble a tremendous amount of information on their problems, and make systematic efforts to organize and interpret these facts. The informants reported that they always explored a problem at great length and completely saturated their minds with the subject before trying to arrive at a solution.

Teaching Techniques of Obtaining and Organizing Information. Certain abilities in work-type or study-type reading are of especial importance in securing and organizing data on a problem. It is essential, for instance, to learn what are the best sources for locating information on a wide range of topics. Where to find data on rainfall and other climatic conditions, on population trends, on exports and imports, and on governmental services and activities, are examples of the knowledge which should be acquired throughout the pupil's school experience. In a recent bulletin on the testing of learning abilities in the social studies, the following item is suggestive of the information on sources which should be acquired:

Which of the following would be most appropriate as a reference in writing a long theme on the subject of "The Monroe Doctrine"? (1) Bartlett's *Familiar Quotations*, (2) *Who's Who among North American Authors*, (3) *Encyclopedia Americana*, (4) Putnam's *Historical Atlas*, (5) Haggard's *Devils, Drugs, and Doctors*.¹¹

The Use of Reference Books. How to use sources once selected involves a large number of special skills, such as how to locate material through the index and the table of contents, and how to use dictionaries and other reference books. The bulletin on testing techniques in the social studies mentioned above emphasizes the interpretation of tabular data; reading of circle, bar, and profile graphs; knowledge of common abbreviations in historical material; and interpretation of statistical data.

Evaluation of Information. To locate sources and to extract information from them is not enough. It is essential to evaluate the adequacy of these sources. One must make judgments concerning the accuracy and completeness with which the data are

likely to be presented, and also the reliability of the material. It is important, for example, in using books to be sensitive to the sort of bias which they may implicitly contain. Sometimes, but not always, this can be determined by reading the author's preface. The student should be conscious of the editorial policies of such magazines as the *New Republic*, *Nation's Business*, the *Saturday Evening Post* and the *Nation* when he is reading either editorials or articles in these journals. He should consider, with respect to each problem he is studying, which of several available sources might be the most accurate, complete, and unprejudiced, or how, by using several references, he could secure a more complete fund of information as well as all points of view on the subject.

Abilities Important in Evaluating Information. Other abilities which are important in obtaining and evaluating information on social studies problems include the following: the ability to distinguish between sources and secondary materials; the ability to discriminate between statements of fact and statements of motive; the ability to distinguish statements of fact from statements of opinion; the ability to judge the pertinence of questions and the relative significance of issues with respect to a given problem.¹²

The Value of Practice in Outlining. Since, in the actual situation, the data necessary for solving a problem are not presented in ready-made fashion in a textbook, pupils should have a great deal of experience in going to multiple sources for data. In this process, they should receive instruction not only on how to obtain reliable information, but also on how to assemble and organize it so that it will throw light upon the essential questions they are considering. This means that they must learn how to summarize information, how to classify it with respect to major topics, and how to draw valid conclusions from it. One of the best aids in organizing information is the outline. Many people do not know how to outline; too often they merely make a list of points. But a succession of items is not an outline, for it lacks proportion, emphasis, and meaning-

ful pattern. Outlining should be taught as one of the necessary tools of learning.

Skills in Locating, Evaluating, and Organizing Data Can Be Learned. All of the abilities in locating, evaluating, and organizing information which we have discussed can be learned. As in the case of other kinds of achievement, the number, difficulty, and complexity of tasks which are mastered will depend upon the intellectual capacity of the learner. But we can at least teach pupils to be more systematic in their mental work than they would become without guidance. Therefore, the abilities in question should not be left to incidental learning, but should be the subject of systematic instruction. Improvement in these mental tools is one of the most effective ways to increase ability to solve problems.

DISCOVERING RELATIONSHIPS AND FORMULATING HYPOTHESES

In Dewey's analysis of thinking, the third step is the formulation of inferences or hypotheses from the data. In the actual process of reflective thinking, of course, one does not complete the definition of the problem and the gathering of data before he indulges in any hunches or inferences concerning the solution. These activities go on together.

The Nature of the Process of Inference. Though making inferences is the most critical phase of problem solving, its psychology is not very well known. Hypotheses depend upon the perception of relationships among the data that have been or are being assembled on the problem. Not any type of relationship among the facts and principles, of course, will serve. The particular relationships which are useful are determined by the nature of the problem, by the question to be answered. But how these relationships are discovered is still a rather mysterious matter. Because the psychological processes involved in inference are obscure, practical means of improving this aspect of reasoning cannot be suggested as confidently as can methods of improving skill in locating and organizing data.

Suggestions for Securing Fruitful Inferences. Saturating the mind completely with all the important features of the problem seems to be the necessary background for fertile inference. Then the reasoner should go systematically about the process of discovering relationships. The more aggressively one searches for possible solutions, the more likely fruitful inferences are to appear. There is a considerable amount of trial and error or, as we have chosen to call it, approximation and correction, in this procedure. In solving mechanical puzzles, much of this exploration and trial is overt, but those who are most skillful are the ones who, instead of spending all their time in actual manipulation, conduct a large part of this maneuvering ideationally in connection with studied efforts to see pertinent relationships. Although successive trials in purely verbal problems are mainly ideational, the process of approximation and correction is still a characteristic and important feature of reasoning. As we have explained previously, the purposeful manipulation of ideas may be the means of restructuring the situation, changing the layout of the field so that relationships which were difficult to perceive become more apparent.

The Importance of Persistence in Seeking Hypotheses. Failure to find a solution often results from giving up too soon. Many attempts may have to be made before the correct solution appears. Sometimes the right hypothesis will emerge as a sudden "flash" after a considerable period of exploration. In other instances, insight may emerge much more slowly and gradually. Often, the principle involved may have to be formulated by working back from the solution to the steps which constituted the way out of the difficulty or the means of reaching the goal. The answers to difficult questions do not ordinarily "pop out" immediately. They are more likely to result from systematic variation in trying out leads and cues.

The Importance of Flexibility. Flexibility of approach is a crucial factor in reflective thinking. Poor workers often stubbornly hang on to a fruitless cue while more efficient persons are trying new leads or exploiting different methods. In attempting to solve a mechanical puzzle, one of Ruger's¹⁸ sub-

jects spent ten hours on one line of attack. At the end of this period, he was requested to try another attack, but when observed again an hour and a half later, he was still working on the same futile cue. The same sort of inflexibility is often found in working with mathematical problems, with practical situations, or with social issues.

Danger of Resort to Stereotypes. Unfavorable problem-solving attitudes often take the form of stereotypes, such as the notion that the first principle of public finance is to balance the budget under all conditions, or that all the ills of business are caused by the intervention of governmental agencies. Many people show a tendency to solve new problems by recourse to a relatively few well-worn assumptions which may no longer work. The attempt to change an opinion, to venture a new solution, is usually somewhat disturbing and perplexing in much the same way as an attempt to speed up in reading or adding or to adopt a new method of typewriting. The ease and security that result from standing by old habits of thought and action oppose the tendencies to break away, to develop and try out new possibilities.

The Importance of Open-Mindedness. Originality, however, depends in considerable degree upon habits of open-mindedness, of keeping alive to a wide variety of stimuli, and of remaining sensitive to all of the suggestions that a situation may contain, rather than thinking only along the line most readily suggested. On the other hand, a tendency to flit from one to another feature of a problem in superficial fashion or to discard one line of action as soon as another comes to mind is as serious a fault as sticking to a few cues too tenaciously. Systematic formulation and evaluation of hypotheses is the most promising sort of problem-solving behavior.

The Value of an "Incubation" Period. Sometimes, after a period of intensive work on a problem, it pays to leave the material and do something else for a while. When returning to the matter later, it may be possible to take fresh leads, or to see some cue which had been overlooked. Some writers believe that a period of "incubation" is favorable to the emerg-

ence of new relationships or insights, not only because one may take a new approach after a rest period, but also because there may be "unconscious" work on the problem during this time.¹⁴ It is true that flashes of insight do sometimes occur suddenly in the midst of other activities, which suggests that the problem, though not in the center of consciousness, was not "out of mind."

The Role of "Atmosphere Effect." The psychology of the thought processes is often distinguished from logic. The former is concerned primarily with the *process* of reasoning, and the latter with the correctness of the *results* of reflective thinking. Although such a differentiation is useful, the two approaches to the study of reasoning are really complementary. Within the psychological factors at play in the thinking process, one can often discover reasons for incorrect conclusions. One of these factors has been called the "atmosphere effect." It has been discovered that the total impression or tone or trend of a problem situation may induce a set in the individual which disposes him to accept or formulate conclusions in conformity with the general atmosphere of the situation as a whole, even though such inferences may be incorrect. One of the simplest illustrations of the atmosphere effect is the tendency to use a plural verb in a sentence in which the subject is really singular but in which some word or expression gives the general impression of plurality. The following sentence is a case in point: "The laboratory equipment in these situations were in many instances essentially the same as those used before."

Atmosphere Effect and the Syllogism. Atmosphere effect has been studied experimentally in formal syllogistic reasoning. Subjects untrained in formal logic were asked to accept or reject the conclusions in such exercises as the following:

If all x's are y's;
And if all z's are y's;
Then all x's are z's.

Although this conclusion is invalid, 58 per cent of the subjects accepted it. The positive atmosphere in the premises

apparently "set" the subjects to approve the universal affirmative conclusion.¹⁵

In another instance, the subjects were asked to supply the conclusion for the following syllogism:

All x's are y's;
And all x's are z's;
Therefore — y's — z's.

Although the only valid conclusion is that some * y's are z's, 78 per cent of the subjects concluded that all y's are z's. Again, the total impression made by the premises disposed the subjects to draw a conclusion consistent with the dominant atmosphere.¹⁶

Atmosphere Effect in Everyday Thinking. Atmosphere effect probably operates in many concrete situations as well as in the formal exercises illustrated above. For example, we are often made uncritical of assertions or conclusions when they are presented with other statements toward which we are favorably disposed or with which we already agree. Sometimes this device is used to the extent of dressing up the presentation of an idea with an imposing array of data which may be correct in themselves but essentially irrelevant to the conclusion the author wants his readers or hearers to accept. The phenomenon of atmosphere effect suggests that we should train students to analyze situations carefully, to make a studied effort to detect general impressions that may be misleading, and to maintain a critical attitude. Only by acting warily can one often arrive at sound conclusions or evaluate inferences and proposals made by others.

EVALUATING HYPOTHESES

Three Steps in Evaluating Hypotheses. Implied in the principle that effective thinking depends upon a systematic effort to perceive relationships and state hypotheses is the necessity of evaluating these tentative solutions rigorously. This means, first, that one should determine whether the conclusion

• That is, at least some, and possibly all.

completely satisfies the demands of the problem. Second, one should find out whether the solution is consistent with other facts and principles which have been well established. Third, one should make a deliberate search for negative instances which might throw doubt upon the conclusion. These procedures are facilitated not only by the ability to locate and organize data effectively, but also by attitudes of suspended judgment and critical evaluation. Long ago Binet declared that intelligence included the ability to take and maintain a definite direction, to adapt means to these ends, and to exercise the habit of *autocriticism*. The habit of being critical of one's own inferences is as important as being critical of the judgments of others.

Becoming Aware of One's Prejudices. One of the most important means of stimulating students to be critical of their own thought processes and conclusions is to make them aware of their emotional and ideational prejudices and assumptions. Some recent studies of the influence of emotional and ideational stereotypes have accentuated the necessity of this kind of training. One of the investigations was designed to discover whether emotional reactions to people's photographs influenced the subjects' judgments of the nationalities of the persons pictured. In February fifty college students in a class in social psychology were asked to rate fifteen nationalities on a nine-point scale of favor-disfavor. In March the students were shown sixteen photographs of persons they did not know. Although these photographs represented all of the fifteen nationalities to which the students had reacted previously, no mention was made of nationalities in presenting the pictures. The students were asked to rate each of the photographs on a nine-point scale of favor-disfavor, and write out the reasons for their reactions. In April the subjects were given the same pictures and a list of the fifteen nationalities which they had rated in February, and were directed to judge the nationality of each photograph.

The results showed that the students were unable to make an accurate judgment of the nationalities of the photographed

persons, but that they tended to identify the photographs they disliked with the nationalities they disliked. This procedure may have been due to one of two ways of thinking: "I do not like this person, and I do not like Italians, therefore I shall class him as an Italian," or "This man looks like an Italian, and I do not like Italians, so I shall give this person a low rating." The author concluded from the subjects' reports that the former relationship was the more likely one. Actually, of course, the subjects probably did not make their reactions in the explicit verbal fashion indicated above; their responses were probably less deliberate and more implicit.

Difficulties in Eliminating Prejudices and Stereotypes. A stereotype has been defined as a pre-existing attitude which is "so strong and inflexible that it seriously distorts perception and judgment, rendering them inappropriate to the demands of the objective situation." The import of the investigation just summarized seems to be that stereotypes may be based not only upon ideational content, but also upon deep-seated emotional dispositions. Often the stereotyped reaction is occasioned by a complex of emotional and ideational factors. The author of the study summarized above concluded, therefore, that rational consideration of unfounded assumptions and prejudices may be insufficient to eliminate them. In modifying prejudices against races and nationalities, for example, it may be necessary to re-educate emotional responses as well as to provide a more adequate factual background for judgments.¹⁷

A Study of Stereotyped Thinking. The fashion in which an individual's beliefs, attitudes, and values determine how he will respond to situations was the subject of an investigation of the influence of political "frames of reference" on the interpretation of ideas. Three groups of college students, one favorable to the New Deal, one neutral in attitude, and one unfavorable, were the subjects. They were read a ten-minute speech concerning the New Deal in which half the material was favorable and half was adverse. After the reading, a multiple-choice recognition test over the speech was administered. Half of the test items were answered in the speech in a manner favorable

to the New Deal and half were answered in an unfavorable manner. Two of the three choices on each item were true and false with respect to the content of the passage. The third choice offered the subjects an opportunity to rationalize their answers (make them consistent with what they already believed) if the right answer was opposed to their own frames of reference but was wrong according to the passage. The subjects were told merely that the purpose of the experiment was to discover how much of the speech they could remember after hearing it read.

Attempting to Become Objective in Thinking. The results showed that, instead of accepting correct answers which were opposed to their own beliefs or biases, the subjects chose the alternative which permitted them to rationalize the conflict. The investigator concluded that the data were consistent with other studies which show that "it is almost impossible to expect objectivity and accuracy in perception, learning, remembering, thinking, etc., when ego-involved frames of reference are stimulated."¹⁸ We should probably have to agree that we can never attain complete objectivity in thinking, but it may be possible to increase our consciousness of emotional and ideational sets which obstruct rational consideration, and thus to protect ourselves in part from their influence. The effort to stimulate such an awareness of attitudinal determinants should be a deliberate phase of teaching how to think.

APPLYING THE SOLUTION

The final step in a "complete act of thought" is the application of the solution. If the problem has been one in the construction of a radio, the repairing of a canoe, the construction of a piece of scientific apparatus, or the completion of a mechanical puzzle, the solution is ordinarily put to work in due course. But the conclusion of a purely intellectual problem often is not put into effect so certainly. We often fail to see the relationship of a general principle to concrete situations. We also frequently neglect to change our actions to make them conform to the results of verbal reasoning. Finally, we may

disregard the bearing of new ideas upon beliefs or judgments which we have previously formed. One of the essential steps in reflective thinking, therefore, is to apply new principles to specific cases, to change conduct in the light of intellectual considerations, and to reorganize and systematize ideas as new conclusions are reached. These processes should be integral purposes of problem-solving activities conducted under the school's auspices.

FORMULATING METHODS OF REASONING AND PROBLEM SOLVING

Methods of Thinking Should Be Learned. Guidance and practice in reasoning should culminate finally in a conscious formulation and utilization of *methods* of thinking, or systematic problem-solving procedures. Teachers of geometry often justify that subject as a means of training students in reasoning, not only in geometry, but in other fields as well. To the extent to which learning in geometry itself is a process of rote learning, the claim is obviously unsound. Furthermore, even if students learn to solve mathematical problems efficiently, they may not acquire thereby any greater ability to reason in general. Logically, it would seem that the only way to use geometry as a means of cultivating methods of reflective thinking of wide applicability would be to make students conscious of method as such, to generalize the procedures and attitudes involved, and to gain experience in applying these processes in a variety of problems. Recent experimental evidence bears out this hypothesis.

Evidence that Teaching May Improve Methods of Reasoning. The effect of different emphases in teaching geometry on scores on a reasoning test was investigated by comparing the gains of three groups: an experimental group composed of pupils in geometry classes in which a definite attempt was made to study basic principles of reflective thinking; a geometry control group, composed of pupils in classes in which there was no explicit emphasis on methods of thinking or application of the kind of reasoning done in geometry to situations in other

fields; and a nongeometry control group consisting of pupils who were not enrolled in geometry and who had had no previous instruction in the subject. The groups were equated on the basis of chronological age, I.Q., and initial scores on the reasoning test. The reasoning test used to measure gains was constructed on the following pattern. A specific problem was presented, followed by a list of several possible conclusions from which the student was to make a choice. The student was then required to select from a list of statements or "reasons" the ones which he thought supported the conclusion previously checked. The test situations were selected from other fields than mathematics, and most of them concerned controversial matters.

In the experimental classes, a systematic study was made of (1) postulational (if-then) thinking, (2) the importance of defining key words and phrases, (3) generalizing from data, (4) reasoning by analogy, (5) detecting implicit assumptions, (6) the nature of indirect proof, and (7) the significance of inverses and converses. "The essential characteristic of the experimental method," according to the experimenter, "was the conscious attempt to make pupils more critical in all of their thinking by the study of thought patterns both in geometry and outside of geometry." The mean gains in reasoning test scores for low, medium, and high ability divisions of the three groups were as follows:

<i>Group</i>	<i>Mean Gains</i>		
	<i>Low Ability (I.Q.'s below 100)</i>	<i>Medium Ability (I.Q.'s from 100 to 119)</i>	<i>High Ability (I.Q.'s of 120 and above)</i>
Experimental	24.2	25.2	30.7
Geometry control	5.0	8.3	13.4
Nongeometry control	5.1	5.1	4.0

It was concluded that generalized methods of reflective thinking can profitably be taught, and that "even what is commonly

regarded as superior geometry teaching has little effect upon pupils' behavior in the direction of reflective thinking unless definite provisions are made to study methods of thinking as an important end in itself." ¹⁹

Critical Thinking Should Be Stressed in All Fields. It would be unwise to infer from this experiment in geometry that a general course in logic or reflective thinking should be sufficient to develop the ability to think critically in all fields or in all kinds of life situations. From all that we know about learning and the transfer of training, it seems much safer to assume, for the present, as the authors of the recent monograph on the testing of study skills in the social sciences have done, that "critical ability and reflective thinking tend to develop along with knowledge and understanding in separate fields rather than as universals or generally transferable values." ²⁰ Training in critical thinking should, therefore, become one of the specific purposes of instruction in all fields. The same writers realize that critical abilities cannot be assumed to develop incidentally. They take the position that "the intelligent teacher has realized the necessity of training students in methods of acquiring, evaluating, and expressing social learning as a corollary to developing their knowledge and understanding of the materials of the social sciences." ²¹

REASONING AND PROBLEM SOLVING IN THE AREA OF PROPAGANDA

The emphasis on critical thinking which has appeared recently in the educational literature is a commendable one. However there has been a tendency to look for easy means of developing critical attitudes and analytical methods. This has been especially apparent in discussions on analysis of propaganda. Some people have confused critical facility with the ability to identify methods of persuasive appeal. Teaching material has been prepared to train students to recognize such devices as (1) name-calling—discrediting an individual by disparaging epithets, such as "communist," or "tory"; (2) glittering generalities—using vague but high-sounding and favorably

toned phrases and statements; (3) transfer technique—identifying something with individuals or institutions which have great prestige; (4) testimonials—securing indorsements from prominent people; (5) plain-folks device—appealing to the sentiments and activities of the “common people”; (6) card-stacking—misrepresenting the facts, telling only part of the story, or otherwise deliberately distorting the truth; and (7) the band wagon—asserting that something has wide general approval or that “everybody’s doing it.”²²

The Effects of Detecting Methods of Propaganda. Will learning to detect methods of the propagandist assure the critical evaluation of the ideas or the programs that are being promoted in such fashion? Hardly. First of all if these devices are used subtly, it is often impossible to identify them unless one is familiar with the subject matter of the discussion. Second, the validity of a proposition cannot necessarily be determined by analyzing the methods by which it is presented. Third, while it should be possible to identify and minimize persuasive appeals with respect to a given topic or series of problems, we do not yet have evidence that this ability will transfer in sufficient measure to other kinds of situations or contents. Fourth, one may be able to detect propaganda techniques and still be influenced by them. This was shown in a recent investigation on the effect of persuasive films on students’ attitudes. Seniors in journalism, who had had instruction in methods of propaganda, were shown a twenty-minute persuasive film which urged workers to organize into labor unions. Before and after the film was shown, the students were given a test of attitudes related to the labor problems treated in the moving picture. They were also given, after seeing the film, a test to determine whether they could perceive and analyze the persuasive appeals which had been used in the picture. The results revealed that there was a shift in attitude in the direction intended by the moving picture, and that the students who were most able to analyze the propaganda techniques were no more resistive than the others to the influence of the film on their attitudes.²³

Further Evidence on the Effects of Detecting Methods of Propaganda. Another investigation, using textual material rather than films as the medium of appeal, also failed to verify the assumption that instruction in methods of propaganda will protect students from the influence of persuasion. The subjects were pupils enrolled in the eleventh and twelfth grades in twenty pairs of social studies classes in seventeen high schools. One class in each pair was designated as the experimental class, and the other considered as a control class. The pupils in the experimental classes spent six days studying a unit of instruction called "Public Opinion and Propaganda" which had been prepared in the manner suggested in the publications of the Institute for Propaganda Analysis. The pupils were told that this unit was a regular part of the course. The control classes carried on their ordinary classwork; they received no instruction on propaganda techniques. Four weeks after the beginning of the work on the instructional unit, both experimental and control classes were given the Peterson-Thurstone scale of *Attitude toward Capital Punishment*, Form A, and an achievement test measuring knowledge concerning capital punishment, prepared especially for the experiment. Immediately after taking the tests, the pupils read a selection which had been prepared to present propaganda in favor of capital punishment—"Why Capital Punishment Is Necessary." As soon as they had read this material, they were given Form B of the attitude scale that had been used as a pretest. Two weeks later all the classes were given the same form of the attitude scale again to get some indication of the permanence of the attitude changes which had occurred as a result of reading the persuasive material.

The results of the experiment showed that, although only the experimental groups had studied the unit on propaganda devices, both control and experimental pupils shifted attitudes significantly after reading the selection on the necessity of capital punishment. Furthermore, there was no significant difference, either in the immediate or the delayed reactions on the attitude scale, in the shift which the instructed and the

noninstructed groups made. The relationship between shift in attitude and both intelligence and knowledge concerning capital punishment was negligible.

Osburn, who conducted and reported the investigation, concluded that the results strongly suggested "that attempts to teach resistance to propaganda with respect to social issues by emphasis only on the 'form' in which propaganda commonly appears will be unlikely to succeed." He suggested the hypothesis for further experimentation that it would be more effective to study methods of propaganda for the purpose of fostering a critical attitude with respect to social issues concurrently with systematic inquiry into these questions. "Possibly critical thinking can be developed best," he suggested, "when pupils are taught in such a manner, throughout their school experience, that they must constantly use information in problem-solving situations and in such a manner that they are constantly forced to make tentative conclusions as a result." ²⁴

Summary Concerning Critical Evaluation. The available evidence strongly indicates that there is no short cut to critical evaluation or to the making of sound judgments. Before one can determine whether a statement is valid, he must be certain that it can be supported by relevant, accurate, and sufficiently extensive and consistent data. He must also decide whether or not the inferences which have been drawn from the facts are justified, and perhaps whether the full bearing of the data has been apprehended. The same process is necessary for constructive thinking, except that, when one is attempting to solve his own problem, he must construct his hypotheses as well as evaluate them after they have been made. It is worth repeating again that reflective thinking is hard work that calls for both rigorous and thorough procedures. But it is just that kind of experience which the school should provide for future citizens of a democracy.

CREATIVE IMAGINATION

Relationship between Reasoning and Creative Imagination. Perhaps this chapter should not be closed without a com-

ment on creative imagination. Some of the discussions on creative activity in modern schools seem to suggest that children can be expected to make artistic things without any training in techniques or any background of experience and information. The notion is, apparently, that all that is necessary is for children to express themselves; no questions are asked about what is to be expressed, or how skill in expression is to be attained. The assumption is, too, that creative imagination is not comparable in any way with what we have described as critical evaluation and reasoning.

Contrasting Aspects of Reasoning and Creative Imagination. It is probably true that the reasoning involved in criticism affords about the sharpest contrast, in certain respects, with creative imagination that can be found. Compare the music critic and composer. The music critic must be able to analyze a composition, to classify and evaluate its elements in accordance with recognized norms of good usage, to see the similarities to, and differences from, other compositions, good and poor. Superficially, this type of thinking seems to be very different from that involved in creating a composition. The composer must imagine new things, not merely react to what is before him. To be sure, he utilizes recalled facts and must work, in his imagination, with musical notes. His work, however, is that of arranging new combinations of these notes to accomplish his purpose; he must create. Perhaps many melodies or themes or arrangements come to him only to be discarded. They are discarded, however, in the light of some standard; because they fail to suit his purpose, which may be to secure a new combination of a prescribed type.

Essential Similarity between Reasoning and Creativeness. Really, the new combinations which occur to him are psychologically much like the "trials" of the person trying to solve a difficult mechanical puzzle or the insights of the mathematician working on a difficult problem, or the hypotheses of a scientist searching for a general explanation of the movements of clouds or stars. The trial movements or insights or hypotheses are really new combinations of simpler movements, operations, or

ideas, respectively, just as the tentative melody is a new combination of strains or notes. In all of these cases, moreover, the trial product must be evaluated in the light of other facts, rules, laws, or standards of some sort. The test of the manipulative response is simply whether it unlocks the puzzle; the test of the mathematician's insight is whether it produces the right answer; the test of the scientist's hypothesis is less precise and final, but it must explain all of the facts, must explain them in the simplest way, and must be consistent with explanations in related fields. The test of the musical composition is still less rigid and conclusive, but it must observe certain accepted standards of harmony, rhythm, form, and originality. Thus the distinctions between types of reasoning and creative imagination are not so clear as they may appear at first sight.

As a matter of fact, four stages in the creative process have been distinguished which are generally comparable to the steps in reasoning. These stages have been called preparation, incubation, illumination, and verification or criticism. They are not sharply distinguished, of course, but overlap greatly.²⁵

Preparation is the period when various ideas or plans or purposes are considered. When one of these ideas is accepted, it is elaborated in a variety of ways, and possibly modified to a considerable degree during the period of incubation. Actually, among poets, musicians, artists, inventors, or scientists, this period may last for a long time, even for years, during which the individual may be unable to reach a solution of his problem.

Then, in the stage of illumination, the idea, the solution, or the structure as a whole, whether it be a painting, a poem, a musical composition, or a scientific discovery, may take form suddenly. This process has been described as follows:

... suddenly, usually in a moment when the work has been temporarily abandoned, or when the attention is absorbed by irrelevant matters, comes an unpredicted insight into the solution, usually interpreted as a reorganization of the perceptual field, especially in regard to the relationship between means and end. As if "inspired," "given," arise ideas which constitute a real integration

of previously accumulated experience—an answer, a brilliant hypothesis, a useful hunch, forming, it seems, a short-cut to artistic or scientific advance (Hutchinson).²⁰

The final stage is the process of working out the details in conformity with the solution as a whole. This is the period of criticism and revision leading to the final and complete form in structure as well as in detail.

The field of purposive, controlled, selective thinking thus is as broad as the world of facts that may be perceived or imagined, but the characteristics of purposive thinking are very much alike whatever the purpose, the kind of facts utilized, the character of the products, or the nature of the tests of validity applied.

Influence of Products of Masters on Originality. In thinking of the fields of literary, musical, and other artistic productions, not only control of fundamental skills and techniques, but also familiarity with the products and techniques of the masters seems to be quite as useful as acquaintance with the facts is essential to originality in other fields. In the aesthetic fields, the fear that familiarity with other products may cramp or inhibit originality seems to be more frequently and tenaciously held than in business, mechanics, or science, but for no good reason. In the better types of instruction in composition, drawing, design, and the like, more attention is given than formerly to study of good products, to theory and technique. Originality is fed by such equipment; starved by poverty of examples and precedents.

SUMMARY

Individual Differences in Degree of Reasoning Ability. There are wide variations among individuals in reasoning ability, but any measure of reflective thinking in an unselected population will show that it is distributed continuously. We cannot say that only a small proportion of the population can reason, for such a statement would imply that a sharp division could be made between those who possess reasoning ability and those who do not. Since the distribution is a continuous

one, differences in the ability to do reflective thinking are differences in degree.

Although there is a close relationship between intelligence and problem-solving ability, one should not assume that the higher mental processes develop instinctively to the optimum level of functioning. Training in systematic methods of problem solving is necessary for the attainment of maximum efficiency.

Reasoning Ability in Children. The ability to reason does not appear suddenly but develops gradually with age and experience. Children can solve problems even at the preschool level. As they approach adult status, they will discover solutions more rapidly and with fewer errors, they will be more systematic in exploration and in the formulation and evaluation of hypotheses, and they will make more adequate generalizations. But the differences in the reasoning of children and adults are differences in degree and not in kind. This means that education at all levels should make maximum use of the higher mental processes.

Nature and Process of Problem Solving. Problem solving occurs when ready-made patterns of response are not adequate for overcoming an obstacle to the satisfaction of a need or the attainment of a desired goal. Problem solving is a form of learning in which the appropriate response must be discovered. The important features of the process are the selection of relevant data from past experience, the collection of further pertinent information, and the reorganization of all the essential factors into a new pattern of behavior which meets the demands of the problem situation.

Many of the so-called problems which we "assign" to pupils are nothing but routine exercises. It is still possible to find textbooks in algebra, for example, which present a type problem at the top of the page and list underneath it a series of "verbal problems" which can be "solved" merely by setting up the same kind of equations as those in the example. Such exercises ordinarily entail very little reasoning and may be done with even very little understanding.

What constitutes a problem for a given individual is essentially a subjective matter. There are all kinds of problems about us which we do not see or, if we are aware of them, about which we are entirely unconcerned. Problems grow out of information and interest; problem solving is a response to personal need. We may expect pupils really to take hold of difficulties that are related to their experience and instrumental to their goals.

Defining the Problem. Reflective thinking cannot be effective unless the problem is clearly and fully defined. It is futile to ask pupils to think through broad issues until the most important features of the problem as a whole have been discovered. Dividing the total situation into related subproblems or topics makes it manageable. It is the explicit definition and understanding of the problem itself which guides the recall of pertinent experience and the search for new facts, and which determines the form in which the data must be reorganized.

Collection and Evaluation of Information. There is no more fruitful means of improving problem-solving ability than to inculcate respect for evidence, and to encourage the habit of thoroughness in obtaining information on complex issues. Perhaps the most important tools of reflective thinking are the abilities that are necessary in selecting sources, evaluating the reliability of sources, getting accurate meanings from reading, and organizing information into coherent patterns of ideas. But collecting data is obviously not sufficient; it is necessary to make a systematic effort to perceive relevant relationships, and to formulate and evaluate hypotheses. The entire atmosphere of the classroom will have much to do with the development of critical attitudes and a determined search for the truth.

Other Essentials for Effective Thinking. Pupils should learn to exploit cues thoroughly, but also to maintain a flexible attitude which will ensure fresh methods of approach and a consideration of all points of view. It is especially necessary to analyze the statement of a problem carefully to avoid misleading cues and to secure an accurate knowledge of what is asked for and what is given. Pupils should learn to examine

their own reactions for emotional biases and preconceptions which may obstruct an objective treatment of a problem situation.

Experience in reflective thinking should culminate in the acquisition of systematic methods of thinking. This means that methods of mental work themselves should be consciously identified, generalized, and applied in pertinent situations. To understand and use the scientific method, for example, one needs to react to the *process* of scientific thinking as well as to the empirical data which constitute the *content* of reasoning. These attitudes and procedures should be generalized into fundamental principles, and the individual should make deliberate use of them in subsequent learning.

Although there is some evidence that generalized attitudes favorable to thoughtful consideration of problems may be acquired under appropriate educational guidance, the data indicate that critical ability and reflective thinking develop with knowledge and experience in separate fields, rather than as universals which can be taught in a general course in reasoning or logic.²⁷ The ability to make critical evaluations and to solve problems constructively in social studies, science, personal and social living, and in other fields should not be left to incidental learning, but should be developed through systematically planned activities.

The Relation of Creative Activity and Problem Solving. Creative activity and problem solving are not essentially different forms of behavior. Contrary to the assumptions of some educators, mere expression does not seem to be especially worth-while. Creative work in music, art, and writing is valuable to the extent that pupils acquire progressive mastery over the essential skills and techniques of these art forms, not as an end in itself, of course, but as the means of more effective expression. Creative imagination, furthermore, is not something which emerges full-blown, but depends, like problem solving, upon a wealth of experience and a store of meaningful ideas.

Foundation of Reflective Thinking. It may be well to emphasize again in closing that reflective thinking cannot take

place in a vacuum. There is one sense in which the admonition to teach how to think rather than what to think is specious. There is no value in emphasizing *method* out of relation to *content*. The product of thinking can be no better than the ideas that were used in arriving at the conclusion. For that reason, the processes which were discussed in the preceding chapter on the development of meanings and those which are involved in reasoning should be considered as interdependent. Even more specious, therefore, is the slogan that we should teach ideas instead of facts, have pupils solve problems instead of acquiring information. It is entirely justifiable to condemn the memorization of numerous unrelated and functionless items of knowledge. Facts get their meaning and value by use. What competent teachers are doing, therefore, is not handing out ideas and conclusions ready-made, to be memorized and passed back, parrotlike, in a recitation, but stimulating pupils to acquire information as a means of bringing about desirable consequences, as a means of solving their own problems.

QUESTIONS AND EXERCISES

1. Try to locate, in an autobiography or magazine article or elsewhere, some eminent thinker's account of how he solved some particular problem or made some invention. Examine the report critically, especially the part in which advice is given, to observe what really useful suggestions are presented.
2. To what extent do you believe reasoning ability is a reflection of general intelligence? From the information given in a previous chapter on the "nature of intelligence," discuss its relationship to reasoning.
3. Does the average farmer, chauffeur, stenographer, salesman, cobbler, housewife, physician, or banker reason very much? After several years of experience in any of these vocations, is it more or less *necessary* to reason in order to get along more efficiently than at the beginning? After several years is one more or less *able* to reason in that field?
4. Why is "reasoning ability" regarded as especially important in a democracy? Cite examples and evidence to make the reason for your answer explicit.

5. Criticize or defend these statements: "Necessity is not the mother of invention. Knowledge of previous inventions is the mother; original ability is the father."
6. In the course of your schooling were you given direct training for efficiency in reasoning? How was it worked into your program? Where else do you think it might have been introduced to advantage?
7. State your opinion on these assertions: (a) We require in general too much learning by rote in our schools and colleges; (b) if we clutter the student's mind with memorized facts we interfere with his thinking; (c) it is not that too much is memorized, but rather too little; (d) it is not that too much is memorized, but that unessential material is learned; (e) not too much memorizing is done, but memorizing in ineffective ways.
8. Which is more likely to stimulate a high school boy to think—the study of formal logic or a serial detective story? Will either improve ability to reason in general? What material would be better than either?
9. Express in a sentence or two the essential relationship as you see it between reasoning ability and the "concept formation" which was discussed in a previous chapter.
10. If you were trying to encourage students to attempt to think, to invent, create, solve problems—would you choose tasks very easy or very hard or moderately hard? Why? Compare with your choice of opponents in wrestling, tennis, etc. Is there any basis of comparison here? If so, what?
11. Take this practical project which will probably provide occasion for problem solving for anyone: Devote a half hour to making a workable weekly time schedule for yourself. When it is complete, list in sequence the steps you took in "solving" the problem and analyze the stages in accordance with the outline of the problem-solving process presented in this chapter.
12. Describe in detail the procedure for introducing a reasoning activity into a lesson plan for some elementary school subject other than arithmetic.
13. Can you suggest some methods of training high school students to resist propaganda without centering your approach on "methods used in propaganda"? Use for illustration some piece of propaganda you have seen recently.
14. It was said earlier that "the skills and abilities which are taught

in a modern work-type reading program are indispensable reasoning tools." Go to outside sources if necessary, but explain precisely what this sentence means.

15. List the different kinds of "general reference" books you have had occasion to use in the course of your schooling, and state the chief value of each. Compare your list with the lists of the other members of the class.
16. If all x 's are y 's; If all x 's are y 's;
And if all z 's are y 's; And if all z 's are y 's;
Then no x 's are z 's. Then some x 's are z 's.
Sells used these two syllogisms among others in his study of atmosphere effect. Ask a number of your friends to state whether they accept them as true or not. Tabulate your results and draw conclusions. What do such results indicate with regard to the hazards of writing examination questions?
17. While solving the following riddles, see if you can detect inappropriate methods in your procedures:
 - a. Use me well and I am everybody. Scratch my back and I am nobody. What am I?
 - b. What is full of holes and yet will hold water?
 - c. The man who made it wanted to sell it. The man who bought it never used it. The man who used it never saw it. What is it?
18. What distinction may validly be made between propaganda and education?
19. Cite recent instances in which you have detected propaganda in headlines, movies, radio programs, or magazine articles. Just what technique was used in each case? In view of the evidence reported in this chapter what, if any, was the effect of the propaganda on you? On others?
20. Invention. The ordinary tooth-paste tube is unattractive, unhygienic, and clumsy. Think of some attractive mechanism—if possible, a more permanent bathroom fixture—that will remedy these defects. While doing so compare the mental operations with those observed in solving the verbal or mechanical puzzles. What are the similarities and differences? Is this type of invention reasoning or creative imagination? Justify your answer.
21. Artistic creation. The ordinary collar and tie which men persist in wearing is not comfortable, not especially attractive, and

CHAPTER XV



TRANSFER OF TRAINING

However the purposes of education are expressed, they invariably involve the ability of the individual to utilize in new situations what he has previously learned. The assumption underlying the whole educational enterprise is that the knowledge, the skill, and the methods of learning which are required in connection with definite school tasks will not only be available in the future, but will be applied in some measure at least to the solution of new problems as they arise in further schooling and in life.

Some educators have made extravagant claims or unscientific assumptions about transfer of learning. They have confidently expected, for example, that the individual will carry over the arithmetical abilities he learns in the classroom to the problems that he may actually meet in business, in the management of personal finances, or in practical construction tasks about the house. The teacher of algebra often assumes that his pupils will automatically apply their knowledge of equations to the solution of problems in physics. By studying civics, economics, and sociology, the student is expected to gain the ability to interpret intelligently the social problems which will arise in the future. The school has frequently assumed that health *knowledge* will change health *habits* or that a study of dietary requirements will result in better eating habits. Sometimes these expectations of transfer of learning from certain situations to other circumstances have proved extremely unrealistic; in other instances, the results, though nearly always far short of what one might wish, have been more gratifying.

The Problem of Transfer. In somewhat more technical form, the problems involved in the transfer of training are

raised by the following questions: Does practice in perceiving, memorizing, or reasoning with one type of subject matter improve that mental process in general? Can we improve retention, perception, imagination, or reasoning in all fields by training in one? If the answer to these queries should turn out to be a positive one, it would be proper to ask a still broader question: Can we improve initiative, originality, perseverance, reasonableness, love of truth, dependability, or—more broadly—character and personality by practice or training in a specific task? And if so, in what tasks, by what sort of learning, and to what extent?

Before stating the modern point of view and summarizing the recent research on these questions, it will be worth-while to present the background of the transfer problem as it arises in contemporary education.

THEORY OF MENTAL FACULTIES AND FORMAL DISCIPLINE

Nature of the Theory of Mental Faculties. One position on the problem of transfer, old in the history of philosophy and science and even now current in certain circles, is *the theory of mental faculties*. According to this hypothesis, attention, memory, imagination, reason, will, temperament, and sometimes character and other traits are powers or faculties of the mind. Usually the several faculties are held to be mainly, if not wholly, independent of each other. Each faculty is a general power, capacity, or character which possesses a definite unity. Each personality is thought to be the result of some combination of a relatively small number of faculties. It is assumed, moreover, that any particular faculty shows itself as about equally good, average, or poor in all situations. Memory, to be concrete, is the power of acquiring and retaining facts. If you have a good memory everything is easily learned and remembered; if your memory is bad, all facts are learned and retained with about equal difficulty.

Proposed Methods for Training "Faculties." Those who hold this view assume that the faculty is a power, capacity, or

personal characteristic that may be trained as a whole. It is an entity, and it may therefore be improved as a unit. Supposedly, what we need to do is to find the kind of exercise that will most economically train the memory, imagination, will, or character. Once the faculty is strengthened by this device, it will be, thereafter, more efficient for any purpose to which it is put.

Various materials, devices, and methods have always been suggested for improving each faculty. For example, educational authorities once offered special school subjects as a means of improving most of the typical faculties. These quotations indicate points of view confidently held. "Study of Latin trains the reason, the powers of observation, comparison and synthesis." "The pursuit of mathematics gives command of attention" and results in "the strengthening and training of the reasoning powers." "For developing the character, strengthening the will and cultivating a wholesome temperament there is no discipline superior to athletics." "Will power and attention are educated by physical training. When developed by a special act, they are developed for all acts."

The Theory of Formal Discipline in Education. The notion that the mental faculties can be developed uniformly as a whole by training in one subject or on one kind of data has been known in education as "the theory of formal discipline." The term "formal" implies that it is the *form* of the activity and not its content, not the subject matter itself, that is important in education. If the activity is of the form of memorizing, it is assumed that memory could be trained no matter *what* is memorized. To learn to reason, one has merely to practice the forms of reasoning. The term "discipline" implies the real spirit of the theory which is that the major virtues of a tenacious memory, an inflexible will, pure and impersonal judgment and reason are to be secured only by very vigorous and full exercise of the faculties.

Early Experiments on Transfer. By the turn of the century, psychologists had begun to test experimentally the validity of the claims made for mental discipline. Since that time the problems of transfer has been one of the most interesting and crucial

in educational psychology and a very extensive experimental literature has become available, a great deal of it, unfortunately, not very reliable scientifically. We shall report, first, studies stimulated by the extravagant claims for general training. They deal mainly with the *amount* of transfer of the results of unguided training of memory, perception, and similar alleged faculties. "Unguided training" means that the subjects of the experiments were merely assigned learning tasks and permitted to work. Perhaps "unguided practice" would be a better description of the learning activities, since few or none of the several forms of guidance suggested in preceding chapters were introduced. Such experiments test the assumption that formal training is a means of improving "mental faculties."

Transfer of Training in Memory. William James in 1890 was the first to attack the problem of memory training experimentally. James and four of his students each ascertained the time required to memorize material from one author, such as a section of Victor Hugo's *Satyr*. Then, after spending about twenty minutes per day for a month or more learning material from another author, they again memorized passages from the *Satyr*. This investigation dealt with transfer within the same kind of material, and to the same kind of task. Presumably, one could expect more transfer in this situation than one in which the material and task differed in kind from the training series. Three of the four students showed improvement, while the other student and James himself found no transfer. These experiments were really too crude to be conclusive, but they are of historical significance since they stimulated further experimental studies by more refined methods.

The approved technique of studying transfer consists in dividing a group of subjects into at least two groups which are approximately equal in ability. All of the individuals are then given tests of ability, let us say, to memorize each of several kinds of material. This is called the initial test. One of the groups, called the *trained group*, is then given training, usually daily, in memorizing one type of material. One group, called the *control group*, is given no special training during this pe-

riod but is given, simultaneously with the trained group, a series of final tests immediately after the completion of the special training. This device makes it possible to determine how much improvement in the final tests is due to the special training received by the trained group, since the gains that result from taking the initial and final tests alone without other training are revealed by the control group and may be subtracted. The *control group method* is an important and much-used procedure in psychology. This procedure is illustrated in following the study by Sleight: ¹

A group of women students were divided into four subgroups. Group 1, a control group, received no special training; Group 2 learned poetry thirty minutes a day for twelve days; Group 3 memorized tables, such as population data, export and import tables, and foreign coinage systems, thirty minutes a day for twelve days; Group 4 spent thirty minutes a day for twelve days attempting to learn the substance of scientific, historical, or narrative prose selections read to them. Just before and just after the practice series, the abilities of all four groups were measured in the following kinds of learning:

1. Learning series of names and dates given orally.
2. Learning series of nonsense syllables given orally.
3. Memorizing pieces of poetry, read by the experimenter and repeated by the subjects.
4. Memorizing prose, as in (3), verbatim.
5. Getting the substance of a prose selection presented orally.
6. Memorizing a series of nine letters read but once.

By comparing the improvement of each of the three *practice groups* in each function with that of the *control group*, the transfer of training was measured. The results, briefly, were as follows: Each group gained rapidly in the kind of learning specifically practiced. The influence of training in one type of learning on other types was sometimes favorable, sometimes unfavorable. Practice in memorizing poetry produced some improvement in learning tables, nonsense, and prose literally, but a *loss* in ability to learn prose substance or recall letters. Those

who practiced learning tables were more able to learn tables, prose substance, and nonsense, but less able to learn poetry, prose verbatim, and to recall letters. Practice in getting the substance of prose had a bad effect upon all other forms of memorizing save the "immediate" memory for series of nine letters. Apparently, practice in one kind of learning may facilitate or it may hinder other kinds of learning within the same general field.

Other investigations of the effects of the training of memory for one kind of material have shown a transfer of improvement to memorizing other kinds of material that is seldom very great. Often it is negligible and occasionally zero or even negative.

Transfer of Training in Perception. One of the earliest experiments on transfer in the field of perception was performed in 1901 by Thorndike and Woodworth.² They found that subjects who had practiced estimating the areas of rectangles of certain sizes (10 to 100 square centimeters) until large improvement had been attained showed only about a third as great improvement when slightly larger rectangles (150 to 300 square centimeters) were given or when the areas were kept constant but the shapes changed. These investigators also found that a period of training which brought about considerable improvement in judging the lengths of lines from one-half to one and one-half inches in length yielded no increase in ability to estimate lines from six to twelve inches long.

Another investigator (Kline)³ gave nine individuals practice in canceling *c*'s and *t*'s from thirty to forty-five minutes a day for fourteen days. Before and after the practice, the subjects were tested in canceling nouns, verbs, prepositions, pronouns, and adverbs. Eight other individuals, who served as a control group, were given the same initial and final tests, but received no practice in canceling *c*'s and *t*'s. On the final tests the practice group showed less ability in canceling nouns, verbs, etc., than the control group. Apparently, practice in canceling *letters* may cause not an improvement but a decrease in ability to cancel *words* of certain types. This is known as *negative transfer*.

The Transfer of Training in Reasoning. An experiment done in 1913 (by Briggs)⁴ was designed to test the hypothesis that reasoning, trained in one field, would be improved for work in other fields. The study was designed specifically to test the view, very widely accepted at one time, that rigid training in reasoning in formal grammar would increase in other fields the abilities—

1. To test reasons.
2. *a.* To take from a mass of data all that are necessary and to use them in reaching a conclusion.
b. To demand all necessary data before drawing a conclusion.
3. To reason syllogistically.
4. To detect "catches."
5. To see likenesses and differences.
6. To test critically definitions of all sorts.

Fifty-four tests were devised to measure, in some form, each of these and certain similar abilities. They were given to children in each grade from two to seven in an elementary school before and after three months of intensive training of a rather formal sort in grammar and to control groups who studied composition and other subjects during the same time. This investigation showed improvement in the abilities to deal with the subject matter of grammar but not a uniform transfer of abilities to other situations. On the whole, the influence of the training on reasoning, seeing likenesses and differences, testing definitions, seeing "catches," etc., in other fields was small at best and imperceptible in many of the new situations.

The Unsoundness of the Theory of Mental Faculties and the Theory of Formal Discipline. The studies just summarized are but samples of a large number which have been performed since the beginning of the present century. It should be noted that these studies are based upon the results either of relatively unguided practice, or upon rather formal training, as in the teaching of grammar, in which few of the devices mentioned in our chapters on generalizing and reasoning were utilized. These studies were, as pointed out, designed primarily to test the

faculty theory and the theory of formal discipline. The results are decidedly antagonistic to both theories for the following reasons:

1. Although the effect of training in memorizing (or perceiving or reasoning with) one type of material is usually a marked increase in ability to memorize (or perceive or reason with) that specific material, there appears a relatively small improvement in ability to memorize (or perceive or reason with) different, sometimes even slightly different, material. *The improvement, in other words, does not transfer uniformly and equally to the learning of other materials.*

2. Although the effect of training in memorizing (or otherwise dealing with) one type of material is usually a marked increase in ability to memorize (or otherwise deal with) that material, its effect upon memorizing (or otherwise dealing with) some other materials may be no change or even a decrease in ability. *The transfer may be of indifferent value or detrimental, as well as helpful.*

It is clear, therefore, that the facts of transfer cannot be explained as due to a general, all-round improvement of mental faculties, such as memory, perception, or reason. These experiments, from the first, destroyed utterly the old theory of formal discipline.

Nevertheless, the disciplinary theory bobs up again in every age. It is the principal support for the recent crusade to restore classical education to a dominating position in colleges of liberal arts. The assumptions behind this movement seem to be that to understand the culture of the ancients will make contemporary society intelligible; that to follow the logic of Euclid will train us to reason, not merely in plane geometry, but in other fields and in all the important affairs of life; that the intellect can be trained independently of emotion and attitude; and that the intellect, disciplined, sharpened, and toughened by grammar, logic, metaphysics, and mathematics, will thereafter range freely, incisively, and infallibly throughout the intricate problems and issues of modern life.

RECENT THEORY AND RESEARCH ON TRANSFER

Investigation has demonstrated that although the extravagant claims for formal discipline proved to be false, transfer frequently does occur in varying amounts. It has usually been small, and in nearly every experiment has turned out to be much less than one would desire. But an analysis of the experimental results has given us an important clue to the conditions which make transfer possible and to the means by which it may be increased. It has been discovered that, on the whole, the carry-over from one situation to another is roughly proportional to the degree of resemblance in the situations. This conclusion suggested the possibility that transfer takes place to the extent to which there are *identical elements* in the old and new tasks. If the relatively novel situation is in part or in parts identical with the familiar stimulus pattern, then it should be possible to carry over from the one to the other the reactions which the individual had learned to make to those particular conditions.

Theory of Identical "Components" Rather than "Elements." As the literature on transfer of training developed, the term "identical element" unfortunately came to be used in an atomistic sense. It was used to refer to highly detailed elements; to extremely narrow common units; almost, at times, to indivisible entities. However, more careful treatments of the problem did not use the word "element" in this narrowly atomistic sense. "What the theory of identical elements demands," writes Woodworth, "is that transfer should be of concrete performances, whether simple or complex makes no difference to the theory. Confusion will be avoided by using the word 'constituent' or 'component' in place of 'element' and by speaking of the theory of identical components."⁵

The theory of identical components, then, would not predict that practice in tennis would improve one's attention, concentration, will, or temperament for meeting all situations or dealing with all kinds of data equally, but would affirm that certain *skills, procedures, and attitudes* such as judging the

flight of a ball, remembering to keep one's eye on the ball, and to keep cool by thinking of the game instead of the spectators would carry over to another activity such as handball to the extent, roughly, that the two games and the general situations have important characteristics in common. What sorts of responses, according to the theory of identical components, may transfer? Or, expressed in another way, what kinds of components may two or more activities or situations have in common?

Transfer of Techniques of Reacting. During practice in memorizing, a subject may learn a variety of methods of attack upon the particular subject matter. For example, if he is learning a list of items, he may hit upon the technique of repeating them rhythmically, a procedure which he may use with lists of different things. He may find that searching for certain of the items to use as landmarks is profitable, and this device may be used on other materials, in some cases advantageously, and in others disadvantageously. Again the subject may use the plan of learning by the whole rather than the part method, and this procedure may be adapted to other kinds of material. From experience, he may discover that his "memory" is not so bad, and this feeling of confidence may recur whenever any task of memorizing is presented. On the other hand, he may acquire habits of using ineffective associations, of disliking such work, of doubting his capacity to improve. When transferred, these activities would interfere with the learning of new data. What is carried over, then, from the point of view of identical components, is not an improved faculty of memory, but a group of new devices, ideas, attitudes—in a word, a new technique, which may be good or bad in whole or in parts.

Transfer of Facts or Information. Not only do we transfer attitudes and procedures to new tasks, but we also may utilize knowledge gained in a given situation in other situations. This is what is presumed to happen when the child uses his knowledge of the simple addition combinations in performing column addition. Previous knowledge may provide cues for the solution of new problems in geometry. Historical information:

may make the literature of a period more understandable. Psychological principles may be applied in writing attention-getting leads for newspaper stories. With information, as with other responses, the amount of transfer, according to the theory of identical components, is determined by the common features of the original learning activities and the situations where knowledge is applied. In many instances little transfer occurs because the individual fails to detect the underlying similarities in the situations which confront him; often, in fact, because he fails to *try* to find such similarities.

Theory of Identical Components the Basis for Social Utility Movement. The principle that transfer takes place through identical components provided the psychological basis for the social utility movement in education. If the amount of transfer depends upon the presence of common features, it is obviously important to make the activities of the school as nearly as possible like those which actually occur in life. The transfer of methods of attack, of knowledge and insights, techniques of learning and problem solving, interest, poise, habits and ideals of caution, honesty, accuracy, thoroughness, initiative, etc., to the situations of life will be large, supposedly, to the degree that the subject matter and activities of the classroom are similar to those encountered in life outside the school.

The social utility movement has turned the attention of the school to the real and significant concerns of human living, and away from unreal or fantastic problems and trivial and impractical information. Some of the results of this emphasis on reality in the school are attempts to determine what words we need to spell in the writing which we actually do; what arithmetical knowledge and ability we need to use; what historical and scientific information it is essential or worth-while to know; what problems in relation to health, recreation, public affairs, home membership, vocational orientation and training, and personal and social adjustment we must solve in satisfying and helpful living. The modern school gives students opportunities to put useful knowledge and abilities to work in meaningful and life-like situations.

Encouragement of Lifelike Methods of Learning. A second movement in education which was the logical outgrowth of the principle of identical components is concerned with the *method* of acquiring information, skill, reasoning ability, and other educational outcomes. It is a movement aiming, in general, at making methods of learning as similar as possible to those most suited to real life. It assumes that, in life, persons are largely engaged in solving practical problems, meeting new issues, planning and carrying out numerous purposeful enterprises largely on their own initiative. The modern school believes that school and life would be improved if persons could set up purposes and formulate problems, devise and master the means to attain their goals and solve their difficulties, and persevere in the endeavor until the project has been completed and the results applied.

These educational adaptations are evidence of the conviction that the surest way to acquire ability to solve important life problems and to consummate worthy projects and purposes is to begin early to do so. The more lifelike the problems, activities, and purposes are, the greater the transfer from them to life will be; the more satisfactory the methods of procedure in dealing with them in school, the more helpful they will be in meeting the situations in out-of-school life. In several directions, then, the theory of transfer by identical components has encouraged and justified movements designed to make education, in its choice of materials, methods, and spirit, less academic, artificial, and isolated and more closely related to significant personal and social activities. The school more and more seeks to help pupils to learn how to participate fully and effectively in all phases of modern life.

The Identification of Common Essential Features. We have called attention to the fact that transfer may fail to take place because the individual does not perceive the common essential features of situations which appear superficially to be very different in nature. One might expect the pupil who knows how to multiply in the conventional multiplication exercise to multiply successfully in long division. At least this would

seem to be an excellent illustration of the presence of identical components in two mathematical processes. The evidence shows, however, that pupils transfer their multiplication skills to long division problems only partially. It was this finding which impelled one investigator to recommend that if pupils are to learn to multiply in long division, it would be wise to have them practice it in that context rather than in isolation.⁶ This may be a wise suggestion.

Another useful procedure would be to train pupils to "dig into" situations as a whole and try to find their more subtle features. The teacher himself should often point out the critical or essential facts or relationships which a pupil would otherwise miss. This may be done by asking pointed questions rather than by telling directly. In fact, by every means possible the teacher should encourage the pupil to take an active attitude in searching out the underlying factors which are most significant in a given problem or task. Students who make an active effort to identify the phases of a new exercise in plane geometry which are related to previous theorems are most likely, other things being equal, to solve the problem. The person who gets "at the bottom" of any new situation is much more likely to find that it is not entirely novel, but that it possesses features he has met before. Then he can bring his previous experience to bear on the new situation. For example, internal combustion engines can take many forms. Superficial observation of a machine that one has never seen before may give no inkling of what it is. But when one examines its basic characteristics, he may easily discover that it possesses the necessary features to classify it as an internal combustion engine.

One gets insight into a situation when he discovers its essential features and relationships. These basic, critical characteristics are often so subtle that they cannot be perceived by superficial observation. They may also be obscured by a mass of detail. The same principle may be expressed, usually, in a great variety of specific situations. To cut through specific details to underlying relationships is ordinarily necessary if one would utilize his previous experience effectively in new situations. It

is not the individual items or the gross characteristics, but the pattern, the scheme, the meaning of an experience which is its most significant feature.

THE IMPORTANCE OF GENERALIZATION

In the chapter "The Development of Meanings," generalizing was described as the process of attending to the common feature or principle or relationship in a variety of specific situations. The process of getting under the surface to the subtle and vital components of experience, which we have emphasized in the previous section, is, therefore, the basis of generalization. And there is a growing body of experimental evidence to the effect that systematic generalization of experience is favorable to its subsequent utilization.

Judd's Early Experiments. One of the well-known experiments on generalization was conducted by Judd. The task was to hit a target under water with a dart which necessitated a readjustment of the ordinary way of throwing the dart because of the refraction by the water of the light from the target. The subjects were two groups of fifth- and sixth-grade boys. One group tried repeatedly to hit the target without any instructions whatever. Before the second group began its practice, however, the experimenter gave the boys an explanation of refraction and the relation of the phenomenon to the task at hand. Both groups required the same length of time to learn to hit the underwater target. Then the conditions were modified by changing the depth of the water, which would make further readjustment necessary in throwing the dart. The change in the apparent displacement of the target confused the boys who had had no explanation of refraction, but the boys who understood the theory of refraction adapted readily to the deeper water.⁷

In another of his experiments, Judd gave two subjects practice in adjusting the length of line *C* (in Fig. 19) to apparent equality with the horizontal line between the oblique lines in *D*. The situation can be arranged by having diagram *D* placed on a card, which can then be moved back and forth along line

C. What the subjects were dealing with was, of course, the Mueller-Lyer illusion. One of them received no information concerning the changes which took place as he gradually overcame the illusion and finally made the lines actually equal. The other, however, although he also had to overcome the illusion gradually, was informed of the progressive changes in his responses.

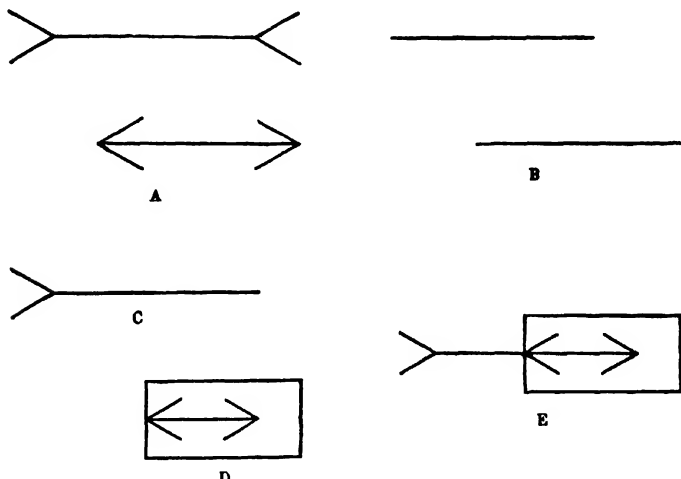


FIG. 19. THE MUELLER-LYER ILLUSION AND DEVICES FOR MEASURING THE STRENGTH OF THE ILLUSION

A, the illusion that the two lines are unequal; B, horizontal lines of equal length; C, the adjustable line; D, the underestimated line on a separate card; E, the combination of C and D, with the horizontal lines set so that they seem equal. (From Judd, *Educational Psychology*, Houghton Mifflin Co., 1939.)

After both subjects had adapted successfully to the illusion, the figure was reversed. The effect of the illusion was now approximately double what it was before the practice series. The subject who had been kept in ignorance of the changes in his judgment but who had nevertheless succeeded in the first instance, now failed in 1,500 trials to overcome the double illusion. Apparently he carried over to the second situation the specific habits he had acquired in the first one, and this pro-

duced a negative effect. The subject who knew about the illusion, however, managed to adapt successfully to the new figure in 137 trials. Judd attributes this performance to the fact that he had generalized the problem and the solution, and thus could approach the second task in an appropriate fashion, even though it was materially different from the first occurrence of the illusion.

Interpretation of Judd's Results. It appears, then, that by *understanding* what occurs, by providing a *rationale* for specific adjustments, or by systematically organizing and generalizing experiences, learning becomes more broadly applicable to the specific forms in which new situations and new experiences occur. Judd points out the educational implications of this kind of learning as follows:

Science instruction is often a failure because it consists in mere drill on isolated items of information. The teaching of mathematics frequently fails because it does not go beyond the presentation of authoritative statements which are true but which have no vital meaning to pupils. The preventive for the narrowness of school teaching and for lack of transfer is to be sought in the organization of instruction in such a way that the learner will constantly be made to see the broad relations of items of experience. A pupil should be taught arithmetic by methods which will facilitate the transition to algebra. He should be taught that the findings of science all group themselves into related systems of generalizations. He should be taught that concentration of attention, analysis, and discrimination are useful habits of mind that he can use in all the situations which he encounters. In short, he should be taught by every possible device to see the advantages of generalization. Generalization is another name for the relating of experiences in such a way that what is gained at one point will redound to the advantage of the individual in many spheres of thought and action.⁷

The importance of detecting the crucial features of experience and of constructing general principles, ideas, or procedures as means of interpreting and managing new situations is so great that recent research on generalization and transfer should be summarized rather extensively.

Effect of Generalization in Transfer of Skill. Instruction in methods of performing mechanical operations has proved to be more effective than specific practice in producing transfer of manual skill. The task in one experiment was that of assembling and stripping an electric lamp holder. One part of the apparatus was used for the learning activity, and other parts constituted the material for the transfer tests. One group of subjects merely practiced assembling and stripping forty times a day for eleven days. The other group received instruction in principles to be observed in carrying out the manipulations. The training covered the following points: (1) general methods of arranging parts on the bench, (2) what to observe with the eyes during the operations, (3) what to observe with the fingers, (4) economical methods of controlling attention and effort, and (5) methods of applying the foregoing principles to the operation as a whole during actual work. The subjects then practiced, with special emphasis on the principles which had been explained. Although the two groups spent the same amount of time, the second or "trained" one repeated the operation only eighty-five times in comparison with the 440 repetitions of the "practiced" group. The "practiced" group showed practically no transfer to the unlearned operations, but the one which had been instructed in the principles and methods of efficient manipulation carried over their training in substantial degree.⁸

Effect of Transfer of Learning in Reasoning. Training in reasoning covering simple techniques of analysis, abstraction, and generalization has improved the ability of experimental subjects to get the point of Aesop's fables. The initial and final tests for both the experimental and control groups consisted of the task of writing the lessons conveyed by fifteen of the fables. In the meantime, the experimental group was given twelve lessons of twenty minutes each distributed as follows: (1) four lessons on analogies, such as "prince is to princess as king is to —," in which the subjects gave the steps by which they arrived at results, and finally wrote out the steps in reasoning involved; (2) four lessons on analysis with abstractions and gen-

eralizations made from the concrete to the general and vice versa; and (3) four reading lessons emphasizing comprehension and analysis of behavior situations and calling for the subjects to write out the mental steps by which they had arrived at the answers. Experimental groups of both twelve- and thirteen-year-olds and adults gained substantially over their respective control groups which had not had the training between end tests. The residual gain of the children was approximately 64 per cent, and that of the adults, 16 per cent. The author of the experiment concluded that the improvement of technique in reasoning can transfer to very different material.⁹

Generalization and Transfer in Arithmetic. Several studies have demonstrated that meaningful generalization in arithmetic facilitates the transfer of training, and may make specific instruction on all detailed constituents of a process or function unnecessary. These experiments have done a great deal to shift the emphasis in the teaching and learning of arithmetic from reliance on mechanical drill to the development of mathematical understanding and to the meaningful manipulation of number.¹⁰ We have already referred to two experiments which showed that meaningful learning and generalization were advantageous for transfer. In the course of instruction and at the end of his experiment McConnell gave four transfer tests to two groups of second-grade pupils. One group had been taught by methods that were confined to specific drill on the basic addition and subtraction facts, and the other had been given instruction that emphasized the meaning and the interrelationships of the combinations. The group that had used the meaningful approach was superior to the drill group on all four tests. Although only one of the differences was large enough to make certain that chance had not accounted for it, the consistency of the results made the case for meaningful learning fairly clear. Incidentally, both groups showed considerable ability to handle untaught processes. On the final transfer test, the percentage of correct responses of the meaning and drill groups were 77.6 and 70.5, respectively, on the section on column addition of three one-place numbers. On the exercises involving

adding by endings without bridging, such as $23 + 5$, the percentages were 64.5 and 49. On subtraction of one-place from two-place numbers without borrowing, the percentages were 48.6 and 39.9. With borrowing, the results were 22.9 and 18.9.

Thiele's investigation emphasized the discovery and generalization of the relationships among the simple addition combinations. This method of learning was compared with drill on each number fact as "a specific element with no relation to any of the other number facts." The second grade pupils in the generalization group were decidedly superior to the drill group on the transfer test given at the end of the experiment.¹¹

This finding was confirmed, and additional data on transfer were secured in a classroom experiment conducted by Swenson with second-grade children. Three groups of pupils learned the 100 addition facts by three different methods in which the variables were the degree of generalization among number facts and the types of organization in which the facts were presented. In "method D," the addition facts were arranged in order of difficulty as determined by studies in which "drill methods" had been used. (This resulted in an essentially mixed order of presentation.) Repetitive drill was the mainstay of this method; using previously learned facts to derive the answers to new ones was discouraged.

In "method X," the teaching method was similar to that in "D," except that the children were permitted to "verify" each newly presented fact by use of concrete materials before the drill process began, and the facts, instead of being arranged in mixed order, were grouped by size of sum, all combinations with a sum of 9, for example, being presented together.

In "method G," the facts were grouped by generalizations. These generalizations, however, were not given to the pupils ready-made; the children were led to discover them for themselves. Examples of the generalizations used (nine in number) were as follows:

1. Adding 0 to a number does not change the number.
2. To add nine to a number, add 10 to one less than the number.

Tests given during the period of instruction and at the end of the experiment revealed that in all three groups learning of certain addition facts transferred to untaught addition facts, to the use of the simple facts in more difficult and complex addition examples, and to untaught subtraction facts. However, the group that learned addition facts around number generalizations showed the greatest amount of transfer, and the drill group the least. Swenson found also that there was a tendency for retroactive inhibition to occur more frequently and in greater amount among children taught by the drill method than among those led to discover number generalizations and organize the facts around them.¹²

In another classroom experiment with fourth-grade children, the outcomes of meaningful methods of learning arithmetic were compared with the results of a more mechanical process emphasizing the habituation of specific steps or procedures. The findings indicated that there was relatively little difference between the two groups in computational skill, but that learning methods which utilized principles of organization and emphasized understanding resulted in superior performance on tests of quantitative thinking in which the test situations differed, not in principle but in detail, from those included in the instructional program. (For example, pupils had been taught to divide with a one-place divisor; in the transfer test they were asked to divide with a two-place number.) This was especially true for pupils of high ability but relatively inferior previous achievement.¹³

Generalization and Transfer in Spelling. The theory that, if one wants to learn something, he should practice it specifically came to dominate instruction in spelling. Horn, for example, advised that, instead of using rules and grouping words according to likenesses and differences, each word should be treated as an individual problem—the pupil should study the words he should learn to spell.¹⁴ Recent investigations, however, have demonstrated that generalizing facilitates transfer of training from taught to untaught words. Gates made a careful study of this problem with 3,800 pupils in 106 classes in grades

two to eight. During an entire school term, the same list of spelling words was taught by two different methods. In one, known as the generalization method, the words were grouped according to common elements, such as common suffixes and common phonetic elements. Pupils' attention was directed to likenesses and differences, and they were aided in generalizing these experiences. Familiar spelling rules were used, but "not taught long or rigorously."

The other method treated each spelling word as a specific learning problem. Instead of being grouped, the words were taught in the order determined by a combined criterion of frequency of use and difficulty. The pupils who had had experience in generalizing showed a superiority of from 6 to 8 per cent in ability to spell "new" words, that is, words which were not in the instructional list, and exceeded by 9 per cent the ability of the other subjects in converting base words into derived forms by adding suffixes and in writing words containing *ei* and *ie* and other common elements.¹⁵

Hoping to discover whether it would be possible to make learning in spelling more economical by grouping and generalization, Breed examined a large number of experiments which involved that problem. He concluded from this critical survey that there was sufficient evidence to recommend greater recognition of rules in teaching spelling. His interpretation, which follows, includes some important qualifications:

The more recent studies seem to indicate that rules will be effective if a limited number are selected with a view to range of applicability, freedom from exceptions, and difficulty of learning; if these rules are inductively developed; and if the children are properly guided in generalizing in new situations. In other words, it seems possible to improve instruction in spelling by a judicious increase of emphasis on rationalization.¹⁶

Transfer in Secondary School Mathematics Often Meager. There is a discouraging amount of evidence that pupils fail in great degree to carry over into other situations the algebra and geometry they learn in the classroom. In the first place, if

pupils encounter formulas or mathematical situations expressed in unfamiliar symbols, they may not recognize them. For example, a state-wide study of achievement in algebra revealed that only 12 per cent of the pupils involved could answer this question correctly:

*If a train runs M miles in five hours, how many miles will it run in K hours at the same rate of speed?*¹⁷

An article on "Our Impractical Education," which deplored the divorcement of theory and practice in the classroom, explained how a man whose formal schooling had ended with the eighth grade showed some amateur carpenters who were building a summer cottage how to square up the foundation. He advised them to start from the corner, measure off three feet along one side, and then four feet along the other. If the distance between these two points was five feet, the foundation at that corner was "square." The observer decided to present the same problem to a college class, the members of which, unlike the relatively unschooled person who had provided the practical assistance, had once studied the Pythagorean theorem. Only 38.4 per cent of the men in the college group were able to produce a right angle, and but 14.7 per cent of the women. Only one-fourth of the students were able to solve the problem.¹⁸

Methods of Facilitating Transfer in Mathematics. By diagnostic procedures, another investigator seems to have hit upon some of the reasons for this state of affairs in learning and using mathematical abilities. His analysis of pupils' errors in geometry revealed that, although an individual may understand a term, perform a construction, or use the appropriate theorem in a relatively simple single figure, he may not be able to do the same things correctly in a complex figure. After all pupils had learned to bisect a single angle in a particular position, 15 per cent could not bisect the angles of a triangle. When only a point and a line were involved, they could draw a perpendicular to a line, but 52 per cent of them made errors when the figure became much more complex. After learning to recognize

two sides and the included angle and two angles and the included side in a triangle, as many as 40 per cent of the pupils failed to identify these segments when the figure involved overlapping triangles. The methods which were devised to increase transference included the following:

1. The figures were first presented as wholes, and pupils were helped to recognize the essential aspects and to discriminate these from the irrelevant ones.
2. Construction problems were analyzed and *generalized* so that the method would apply to any figure and not only to a particular one.
3. Terms and propositions were illustrated in both simple and complex figures.¹⁹

The psychological justification for these methods has been presented in the chapter on the development of meanings. In discussing the process of generalizing, we pointed out that the relationship to be generalized should be presented in a variety of particulars, and in different contexts. In other words, one should promote the "discovery of the constant (abstract) in the variable (the concrete)." ²⁰

The investigation of errors in geometry referred to above also showed that pupils did not understand the nature of proof. To remedy this deficiency, they were given explicit instruction in the nature of deductive thinking. First, the class concentrated on the characteristics of syllogistic reasoning until the essentials of method were clearly established. When formal proof in geometry was first introduced, the steps in reasoning were shown to be specific applications of the principles learned in connection with syllogisms. "The emphasis throughout," according to the report, "was on the *method of procedure* and only secondarily on the geometry. To be sure, the geometry had to be learned and organized because it was the basis of reasoning. But the aim was never to allow the details of geometry to obscure the analysis of the thought processes."

Fundamentals of Teaching for Transfer. This constructive attempt to teach a method of thinking illustrates two of the

most fundamental principles of teaching for transfer. *Many students never see beyond specific details to the underlying relationship or principle.* Unless they are taught to do so, they are unlikely to disentangle *methods of procedure* from certain *materials*. This is not only true in geometry, but in science, where inductive methods are emphasized. Science teachers stress an understanding of the scientific method as one of the primary outcomes of laboratory work. But too frequently, students do little more than follow routine procedures. Thus they do not themselves get practice in the scientific method. Moreover, they do not identify the attitudes and abilities associated with scientific procedures. This means, essentially, that the basis for the transfer of methods of thinking has not been laid. If one is to acquire methods of thinking which are generally applicable and consistently applied, he must first attend to the techniques and procedures of problem solving. Then he must generalize those processes so that they are not tied merely to one type of material or situation. Finally, he must get experience in using these methods in solving many sorts of problems.

This last step has been emphasized by a mathematics teacher who has recommended definite procedures for developing broadly useful methods of thinking in a school subject "for which unbridled claims of transfer values are made without any apparent responsibility for specifying means and methods."²¹ This teacher believes that it is possible, through instruction in demonstrative geometry, to learn to draw inferences logically, and, if taught with transfer in view, to apply this ability to other life activities. He built the content of his course around an understanding of the importance of definitions and agreements. The significance of these two factors in proof was illustrated not only in geometry, but in many other situations, including games, political problems, advertising schemes, and the derivation of scientific principles. Whatever the specific illustration, the teacher emphasized the principle that "any change in either a definition or an agreement was likely to change the conclusion." The members of the class constructed theorems of their own, and so through their own

experience came to understand the necessity of treating agreements and assumptions rigorously. The purposes were to recognize that conclusions "depend on the definitions and assumptions from which they were deduced," and that conclusions are true "only to the extent that these definitions and assumptions are true." The primary objective of the entire course was, not to cover a certain number of theorems, but to have the pupils learn the nature of proof and give them experience in systematic thinking about the problems of modern life.²²

This sort of teaching should stimulate the only kind of behavior that will make transfer possible in substantial degree, namely, a deliberate effort to utilize in meeting new problems what one has previously learned. Through constant application of principles to specific situations, the student should discover the relationships between what he learns in school and what he does in life. To accomplish this end, teaching must have two objectives, which have been concisely stated: "First, it must bring the student to understand as many widely useful relationships, principles, or generalizations as possible; second, it must whet the student's realization that his previous training has wide possibilities for transfer, but that transfer is never automatic. It must bring a realization that transfer comes only if and when one senses for one's self that transfer is possible."²³

Effect of Attitude on Transfer. The consciousness that one is acquiring meanings and abilities which are widely applicable in learning and living is what creates a frame of mind favorable to transfer. The influence of attitude on transfer has been studied experimentally. Three groups of college students were used. One group had been given instruction in how to study; another was studying Latin for the fourth year; and the third had just completed a course in descriptive geometry. Each of these groups was divided into two equivalent sections. Then both sections of each group were given a task to perform which was related to their recent training. The only difference in presenting the task was that one of the two sections in each case was told that their previous training would help them in the performance. This suggestion, of course, was designed to create

the attitude that the previous experience was applicable, transferable, and to evoke direct effort to utilize it intelligently. The method was effective. In all three kinds of tasks, the sections which received the suggestion made superior records.²⁴

This experiment calls attention to one of the reasons why specific learning so often remains specific—fails to spread to other situations or influence subsequent activities. If one learns a specific response to a particular situation, and no question of the applicability of that behavior to other conditions is considered, transfer is unlikely except to situations that are so similar they are almost identical. Moreover, what is merely specific does not acquire the characteristic of transposability. On the other hand, what one thinks of as *general* is useful beyond the particulars in which it is learned; one *expects* it to be applicable and relevant in many other situations. This attitude is all-important in inducing transfer.

Important as it is, however, this attitude is not enough. One must make an aggressive attempt to interpret new problems in the light of previous experience, and to bring to bear upon the novel situation those understandings and abilities which are relevant and serviceable. Teachers often complain that their professional courses proved to be of little assistance in actual teaching. This lack of practicality may be due to several causes. The professional courses may have been *too specific*, that is, they may have attempted to give the prospective teacher a set of particular devices or a collection of specific "methods" without giving him an understanding of the fundamental principles of learning to guide practice as new educational problems arise. On the other hand courses in education are often too general and too exclusively verbal. General principles are discussed without contact with pupils and classroom activities, and too infrequently applied to typical educational problems and practices. Under these conditions, one may justifiably doubt that students really understand the generalizations; what they learn is probably little more than mere verbalism. But no instructor can make the transfer for the student or the classroom teacher. Each individual must make a systematic effort to apply in teach-

ing what he has learned in professional sequences. If he did so, he would discover that his training had been far more useful than he might otherwise concede.

Transfer Eventually a Process of Adaptation and Reorganization of Experience. Education that facilitates transfer is, fundamentally, education that promotes individual adaptability. Orata, who has long been a critical student of the theory and the research on transfer, has pointed out that desirable flexibility of behavior cannot be attained by teaching the pupil merely to apply, rigidly and mechanically, the general principles he has previously learned. He must be alert to the requirements of the new situation, and be quick to see whether the general ideas he brings to it really meet these requirements. Furthermore, through his learning experiences he should acquire the willingness and ability to change his generalizations and conclusions to meet the demands of changing conditions. So, says Orata, ". . . we can *train* the individual in such a way that he behaves like an automaton, or we can *educate* him so that he can act intelligently." ²⁵

In the sense of adaptability transfer rests upon the continuous reorganization or reconstruction of experience. As Orata has pointed out "progressive education" in practice has often valued experience in and for itself, and has neglected the continuity and organization of experience. In too many instances, the curriculum of progressive schools which have discarded the traditional subject organization now takes the form of a series of "activities" which show little relation to one another and do not lead to progressively more mature meanings and to more comprehensive organization of ideas. The dispersiveness which characterizes an unorganized and discontinuous series of "pupil-centered activities" may be much less educative than learning a well-organized body of subject matter. Some kind of logical and functional organization of experience is necessary if it is to be truly developmental. In Déwey's words, "No experience is educative that does not tend both to knowledge of more facts and entertaining of more ideas and to a better, more orderly arrangement of them." ²⁶

NEGATIVE TRANSFER

We pointed out early in the chapter that the effects of transfer may be detrimental, as well as beneficial. It is customary, therefore, to say that transfer may be either positive or negative. Most illustrations of supposedly negative transfer are actually instances in which the *effect* of the transfer is negative. So Woodworth explains that "when an act is carried over but impedes the learning of a second act we obviously have positive transfer but a negative transfer effect."²⁷ A child who has been using phonics in reading often spells new words phonetically. Since English spelling is so often unphonetic, he is likely to spell these words incorrectly. But this is an illustration of the *negative effect of positive transfer*. It would be defensible to call these incorrect spellings "intelligent errors." Carroll actually found, in comparing the generalization of bright and dull children in the fourth and fifth grades, that the bright subjects were much more likely than the dull to spell phonetically. He attributed this to the superiority of the bright children in generalizing ability.²⁸ The same mental processes are probably responsible for the fact that children who have studied specifically such words as "canoe," "canoeing," and "indicate" may, when confronted with the necessity of spelling *indicating*, make it i-n-d-i-c-a-t-e-i-n-g.

Negative effects also occur when one carries over to new performances mental sets, methods of procedure, and ideas which are inappropriate. To illustrate this point, try out this conundrum on your friends: There was a blind beggar who had a brother; the brother died; but the brother who died had no brother; what was the relationship between the blind beggar and the brother who died? Because most of us have the mental set that a blind beggar is a blind *man*, we are likely to be confused by the situation.

Carrying over inappropriate methods from one situation to another has sometimes resulted from an overemphasis on speed of reading. Students who have been drilled on exercises for improving reading rate may attempt to read rapidly without dis-

crimination, instead of adjusting their speed to the nature of the material or the purposes for which they are reading.

THE RELATIVE VALUE OF DIFFERENT SUBJECTS

There remains for consideration the possibility that certain school subjects and activities are intrinsically superior to others as a means of broadly developing mental abilities. Thus it has been urged that some subjects provide exceptional opportunities for encouraging the growth and transfer of desirable behavior. It might be argued that shopwork is especially effective in developing originality and inventiveness; that mathematics, because of the clearness of its logic and definiteness of its tests, cultivates ability to reason; that Latin, because of its difficulty, schools concentration and persistence.

Thorndike's Study of the Influence of Various High School Subjects. Of the many studies of the influence of training in particular subjects which have been made, certain investigations by Thorndike are by far the most suggestive.²⁰ He undertook to determine to what extent a year's training in each of the many high school subjects would increase ability in a series of tests of "selective and relational thinking" or reasoning. About 13,500 pupils in grades ten, eleven, and twelve were involved. The studies were conducted in such a way as to show the relative influence of different groups of related school subjects upon ability in the reasoning tests. The relative influences are indicated in the following table, which shows how much different groups of subjects exceeded, or fell below, the average effects made by the subjects in Group 7.

<i>Group of Subjects</i>	<i>Relative Influence</i>
1. Algebra, geometry, trigonometry, etc	+3.0
2. Civics, economics, psychology, sociology	+2.9
3. Chemistry, physics, general science	+2.7
4. Arithmetic and bookkeeping	+2.6
5. Physical training, athletics	+0.8
6. Latin, French	+0.8
7. Business, drawing, English, history, music, shop, Spanish	0.0
8. Cooking, sewing, stenography	-0.1
9. Biology, zoology, botany, physiology, etc.	-0.2
10. Dramatic art	-0.5

Thorndike's comment on these results is: "The differences are so small and the unreliabilities are relatively so large, that the influence of the subject studied seems unimportant."⁸⁰ The conclusion suggested, then, is that, in representative high schools at the time the investigation was made (it was reported in 1924), a year's training in cooking, sewing, physical training, or bookkeeping had about as much effect upon "general power to think" as an equal amount of instruction in algebra, civics, physics, or Latin. Indeed, one subject was about as good as another. This finding has recently been confirmed by another investigator.⁸¹

The implication of these investigations is that no one subject, because of the intrinsic character of its organization or subject matter or procedure, has outstanding merit as an easy and sure means of developing ability to think in general. This conclusion should be considered in connection with the results of experiments which show that the influence of the learning depends greatly on the way the subject is taught and learned. Mathematics may be made a mere exercise in rote memory of barren facts, distasteful and largely futile, or it may be made an absorbing study of real life problems and mathematical relations activating the finest techniques of reasoning and imagination. What the effects of studying a subject will be cannot be foretold from the name of the subject, or even from its historical prestige. The degree of transfer, to repeat, depends upon the applicability of the outcomes of learning and upon the degree to which their utilization in new settings is provided for by guidance and experience.

The Relation of Transfer and Original Ability. A significant outcome of Thorndike's investigation of the influence of high school subjects upon "selective and relational thinking" in general was the fact that the amount of transfer made by pupils who were good thinkers to begin with was much greater than the amount made by poor thinkers. The pupils who were in the highest 1 per cent in the initial tests of thinking (that is the best pupil in every hundred) made an average gain of 20.5 points on the final tests, whereas the pupils in the lowest

1 per cent made an average gain of only 1.5 points. The best thinkers gained nearly fourteen times as much as the poorest. The original ability to acquire facts, perceive relations and other subtle components, to generalize and manipulate data in reasoning, far exceeds the advantage of one subject over others as they are now taught. Although there are certain exceptions, experiments on transfer show in general that it is positively related to intelligence. The brighter individuals not only learn more, acquire more complex meanings, and generalize more effectively, but they are more successful in utilizing their experience in further adjustments.

SUMMARY

Whether transfer does or does not take place is no longer an issue. The evidence clearly demonstrates that we can carry over what we learn to novel situations. The amount of transfer varies with the individual, the difficulty of discovering the essential features in successive situations, and the methods by which learning is done. It is sometimes extremely meager, and in occasional instances encouragingly large. Nearly always, however, the amount is less than we expected or wished it to be. In any event, transfer seldom occurs automatically. The fundamental educational problem, therefore, is to discover and establish the conditions which are most conducive to the effective utilization of experience. The important question is what methods of teaching and learning will be most productive of transfer.

The answer to this question is by no means complete as yet. Nevertheless, the results of recent experiments have given us the fundamental cues to the solution. These investigations indicate, first of all, that the more meaningful the learning, the more likely it is to transfer. Rote learning, routine and blind rule-of-thumb procedures, and empty verbalism are almost certain to give disappointing results. Where these characteristics dominate, not much learning has occurred in the first place; therefore, there is actually nothing to transfer. If one does not learn to think in mathematics, it is obvious that his courses in

mathematics cannot improve his general ability to reason. Transfer depends upon understanding. Second, what always remains merely specific is not available for transfer, because its significance is restricted to the details in which it first was learned and successively practiced. As the essential relationships in experience are discovered and generalized, learning becomes meaningful and what is learned becomes more available for wide application. The value of generalization as the basis for transfer has been illustrated by several experiments. Examples in other school subjects could also have been given. For instance, in a course on painting, generalizing fundamental principles of design, color, etc., has been shown to facilitate application of these principles in other fields of art, including house design and house furnishing.³²

Learning to think means identifying the methods of successful learning, generalizing them with full meaning of their character and significance, and deliberately applying them in solving practical problems. Finally, the extent to which one utilizes his learning in a wide range of affairs depends upon the alertness and the aggressiveness with which he puts his experience to work. Transfer is not automatic. It depends upon a deliberate attempt to interpret new situations in the light of past experience, and to apply appropriately the meanings or methods previously learned.

QUESTIONS AND EXERCISES

1. If one spoke English until ten years old, then spoke only German for ten years, would the ability to speak English decrease more or less than if one had not spoken at all—that is, had lost the power of speech for the second ten years?
2. William James, in his chapter on "Habit," wrote: "As a final practical maxim, relative to these habits of will, we may, then, offer something like this: *Keep the faculty of effort alive in you by a little gratuitous exercise every day.* That is, be systematically ascetic and heroic in little unnecessary points, do every day or two something for no other reason than that you would rather not do it, and so, when the hour of dire need draws nigh,

it may find you not unnerved and untrained to stand the test." Examine this statement critically and determine what the conditions would have to be for it to agree with the doctrine given in the text.

3. What reactions acquired in playing the piano would transfer to typewriting? To singing? What negative transfer might take place?
4. What is the relation between transfer of training and retro-active inhibition? Give three examples to illustrate the relationship as you see it.
5. Give three examples of practical problems in home cookery which should easily be solved by an individual who had had a very elementary course in chemistry. Do you think many girls apply their knowledge of chemistry to home cooking? Why?
6. Make an outline of the principal topics in this chapter and summarize the evidence for each.
7. Compare the implication of James's statement above with the following by Thorndike: "To study the distasteful that is known to be useful is of much greater disciplinary value than to study the merely distasteful. The habit of value is to *suffer that good may come*, not to *suffer wastefully*. It is in sacrificing for a greater good, not in mere sacrificing, that the mind gains. To suffer simply so as to stand suffering would be as foolish as to learn falsehoods so as to be able to unlearn them."
8. Children often can distinguish right action from wrong action when answering a questionnaire but they don't always do the right when given an opportunity. How do you account for this?
9. Collect some statements from books on education, general reading, or advertisements which are based on erroneous notions of transfer. Criticize them.
10. Under what circumstances will health knowledge change health habits? Suggest a school program which would foster transfer of health knowledge to habits.
11. Suppose it were found in a certain secondary school that the students who had studied geometry were better in reasoning in general than those who had not. Would you consider this satisfactory evidence that training in geometry was responsible for the greater ability in general?
12. Do you think some teachers secure a greater amount of transfer among their pupils than others do? How?

CHAPTER XVI



APPRAISING PROGRESS BY MEANS OF TESTS AND OTHER DEVICES

The improvement of education depends upon the possibility of determining the changes produced by any educational policy or procedure. Unless the teacher can tell what improvements are produced by different procedures in teaching a subject, he cannot discover which is the best. In American schools today there are in use scores of different practices, the relative values of which are unknown and can be discovered only by determining the effects each of them produces in a particular situation. These alternative practices (and many others which appear from day to day) vary all the way from devices designed to produce a very special skill to broad, educational policies and programs concerned with many educational objectives. In any case, improvement in education depends upon trying out different procedures, materials, and policies in comparison with each other and determining what differences, if any, are produced. In order to determine reliably what differences are produced, we must have reliable and valid tests or other methods of appraisal.

Value of a School Appraisal Program. The better schools during recent years have devoted special attention to the development of well-planned programs of appraising the outcomes of teaching and of keeping permanent records of the more important results obtained. The permanent records usually contain not only results of tests and appraisals of the special school subjects and activities but of examinations of intelligence, vision, hearing, etc.; of appraisals of interests, characteristics of personality development, of information concerning home background, special attainments and difficulties, and

many other data of value in arranging the most fruitful conditions for learning and personal development. Most schools recognize the fact that the needs of school children can be successfully met and progress in education made only when definite information about individual pupils and classes can be secured for the teacher and other school officers, and when reliable data about the school as a whole can be made available to the various school officers, parents, the board of education, and the community at large.

Value to the Pupils of an Appraisal Program. The importance of making available to the pupil himself reliable information concerning his achievement and progress, his special strengths and weaknesses, and the character of his goals is assuming increasing importance. The preceding chapters on learning have pointed out the fact that learning activities are far more fruitful when the learner is clearly aware of his objectives, accepts them as worthy, and is able to perceive his progress toward them. The importance of being able to tell in his daily work what progress he is making, which learnings are correct and which are incorrect, which responses are helpful and which are futile or misleading, was also made clear. The school avows its purpose to develop each pupil into a "well-integrated personality," but it often is hazy concerning the exact character of this goal and the precise steps to follow to achieve it. Even in the school subjects the pupils are often unaware of just what they are supposed to achieve and whether many of the steps they take are helping or hindering. Tests and many other devices are now being used to increase the pupil's understanding of the objectives of learning and to enable him to appraise himself. The more detailed and valid the self-appraisal, the more likely the pupil is to assume responsibility for his learning and to pursue it fruitfully.

In a text of this type we can consider only a few of the general characteristics of modern instruments and practices, leaving the technical details for more advanced courses and texts. It will be advisable to begin with a description of a few of the commonly used terms and methods. In this chapter we shall

consider devices employed primarily to appraise scholastic attainment in the narrower sense, such as standardized tests, teacher-made objective tests and essay examinations. The following chapter will be devoted chiefly to methods of evaluating the broader objectives of education by means of ratings, anecdotal records, projective devices, and other methods. In the following chapter newer concepts developing under the term "evaluation" will be considered. Still other concepts and methods employed in studying personality development, especially in connection with problem cases, will be discussed.

NATURE OF OBJECTIVE TESTS

We noted in Chapter VII that the first scale for the measurement of intelligence, the Binet Scale, appeared in 1908. Although a few "tests" of ability in school subjects appeared earlier than this (J. M. Rice, for example, developed a spelling test in 1894), the serious study of methods of testing in education was begun at about the same time by Thorndike in America. The first educational *test* (the Stone Arithmetic Test) was published by one of his students in 1908 and the first *scale* (the Thorndike Handwriting Scale) was announced in 1909 and published in 1910. The scientific study of testing and measurement, appraisal and "evaluation," in education is relatively young.

The "measurement movement" resulted in the rapid development and wide use of what are usually called "new type" objective tests. Following are a few examples.

The Multiple-Choice Test. This type of test consists of a number of test items each of which provides several (usually three to five) alternative responses. One of these alternatives is correct or definitely better than the others. For example:

The Pilgrims came from

Germany England France Spain.

Why do oranges not grow well in Canada?

1. There is insufficient top soil.
2. There is too little rain.

3. It is too cold in winter.
4. Canadian soil is too alkaline.

A multiple-choice test in a school subject consists of a number of such items usually in printed or mimeographed form. The list of items can also be read to the class. The pupil indicates his choice by underlining the chosen item, or writing in its number, etc. The test is usually scored by determining the total number of items correct. Each pupil's list of choices may be studied by the teacher to see what kind of mistakes were made and to gain greater insight into the pupil's understandings and misconceptions.

The multiple-choice item consists of two parts, the stem and the responses. The stem orients the student to the problem that he is to answer. It must be clearly and accurately stated in unambiguous language. It should be brief and stated in such a way that clues to the correct responses are not provided by it. The responses should be consistent with the stem in form. All responses should have equivalent structure and insofar as possible be parallel in length. The incorrect responses should be plausible so that the student lacking knowledge or understanding of the problem might be led to choose them.

Alternative-Response Test. This type of test consists of a number of items each of which provides only two possible alternatives, of which the pupil must choose one. Following are a few examples:

Mark each statement True or False (or T or F or + for true,
— for false)

Psychology is the scientific study of plants. True False

Does the average rainfall in New York City exceeds 50 inches
per year? Yes No

I want everyone to help — himself — themselves.

This type of test is given and scored in the same general manner as the multiple-choice. Many prefer to obtain the total score by the formula: Score equals number right minus number wrong, in order to discount the lucky guesses.

Matching Test. This test consists of a column of items each of which is to be matched with the appropriate item in a second column. The items may be words, phrases, sentences, or paragraphs. The following is an example: ¹

Directions: In the parentheses after each geometric condition given below in column 2, write the number of the results in column 1 that could be proved by it.

Column 1 (<i>Results</i>)	Column 2 (<i>Conditions</i>)
1. Angles equal	66. If two opposite sides are equal and parallel () 66
2. Triangles congruent	67. If perpendicular to the same line () 67
3. Triangles similar	68. If the sides are proportional () 68
4. Lines parallel, etc.	69. If they have equal arcs, etc. () 69

Completion Test. This type of test consists typically of a sentence or paragraph from which one or more words or phrases have been omitted. The pupil is to fill in the spaces to produce the correct meaning, as in the following illustrations.

This is an example of a _____ test.

In this type of completion test, the pupil must recall the necessary word or phrase. This test could, however, be easily converted into a multiple-choice type of recognition test by supplying several alternatives, thus:

This is an example of a _____ test.
 completion matching multiple-choice

The last item makes an unsatisfactory test item because it includes both the completion and the multiple-choice test features. (If only one of the choices were correct, the item would be acceptable.) It illustrates a major difficulty in the construction of all such test items—the difficulty in devising clear-cut, unambiguous issues. It illustrates also the fact that all sorts of

combinations of and variations from the "typical" test types are to be found in objective examinations.

Simple-Recall Tests. The simple-recall test is similar to the completion exercise except that the pupil supplies the answer, usually a word or phrase, not to fill a blank space in a sentence but to answer an implicit or explicit question, typically the latter, as in the following:

Who invented the telegraph? _____

What is the chemical formula for water? _____

If the last exercise is changed to the form "The chemical formula for water is _____" it becomes a completion test; if a series of formulas, only one of which is correct, is provided, it becomes a multiple-choice. These examples illustrate the fact that although there is a clear psychological difference between the recall type, in which the correct response is not given, and the recognition form, in which the answer is provided, the differences in form between the types of devices are often not very clear. It may be noted in passing that there is really nothing very revolutionary or "new" in the form of these exercises. Most of them, and other similar ones, have been used for decades by children in their play in the home and kindergarten in "Guess What" and other games. The contribution of the testing movement is to be found in the careful use of such simple, objective items in constructing tests.

TYPES OR ASPECTS OF ABILITY MEASURED BY STANDARDIZED TESTS

Standardized Test Defined. A typical standardized test consists of a number of items such as those illustrated in the preceding section. When the test of such items is made up by a teacher for local use, it is usually called a *teacher-made* or *informal test*. In a *standardized test* each item has been chosen by a competent person or group and its difficulty and value have been determined by rigid experimental processes that have eliminated weaker items. Definite directions for the administration of the test have been worked out, including the appropriate time limits. Scoring keys have been prepared and rules

formulated for marking papers and determining scores on each part and on the whole test. The process of interpretation of the test results has been standardized with tables of norms for interpreting various scores. We shall discuss "norms" and their uses presently, but before doing so it is useful to note that what a test measures is determined in part not only by the character of the items but also by their arrangement in a test and by the method of giving the tests and scoring the pupil's responses. For example, tests may be organized, given, and scored to measure primarily the difficulty or level of performance, or speed, or range, or accuracy, or some other quality, as well as a combination of these features. A few illustrations will make this clear.

Difficulty, Altitude, Power, or Level Test. This type of test is designed to determine how difficult a task a person can do or how difficult a problem he can solve. The test consists of a series of exercises arranged in order from the easiest to the hardest. The pupil begins at the easy end of the test and goes as far up the list as he can in the time allowed. In most tests of this type, a liberal amount of time is allowed; otherwise the test would probably become a test of *speed* rather than power or difficulty level. Thus, in a reading test, one determines primarily not how fast a pupil can read but how difficult or complex a passage he can comprehend. Power tests of this type have been developed for practically every school subject and for many other performances.

Speed Test. The speed test is usually designed to measure the amount of work of a uniform quality and difficulty which a pupil can do in a given time. A definite time limit thus becomes the indispensable feature of this test. For example, a test of *speed* of reading, which typically consists of a number of passages of equal difficulty, allows insufficient time for the pupil to read *all* the passages. The score is then the number read with the degree of accuracy stipulated by the directions for scoring. Speed tests are mainly restricted to important *skills*, such as speed of reading, writing, typewriting, locating items in a dictionary, computing in arithmetic, etc.

Range Test. The range of information or skill can be measured by determining the number of correct responses given or tasks correctly executed out of a number selected to cover a particular field. Such tests are employed to survey the pupil's knowledge of a field in history or other subjects or of ability to do the fundamental operations in arithmetic or stunts in athletics, etc. In a pure range test, the time allowance must be liberal so as to eliminate the factor of speed of performance, which may be measured separately.

Accuracy Tests. In reading, typewriting, spelling, arithmetic, and other subjects it is often highly important to measure the accuracy of performance. This can be done by using a series of exercises of uniform difficulty. The accuracy of the pupils' work can be indicated by the percentage of errors made in a test. The accuracy of work can, for technical purposes, be determined by making corrections and allowances that render the speed practically the same for everyone. Then it is possible to show how accurately the pupils would work at this or that particular speed.

Quality Test. The objective appraisal of quality has offered one of the most difficult problems to students of measurement. Quality means different things in handwriting, art, sewing, English composition, drawing, singing, composing music or poetry, etc. The Thorndike Scale for Quality of Handwriting,² the first of the type to appear, is shown in part in Fig. 20. Such a scale is used as follows: First the pupil is given a standardized test in writing. Competent judges slide this sample up and down the scale, in a standardized way, until they find a sample on the scale which matches the pupil's product. The number, which indicates the degree of quality in that scale sample, becomes the quality score for this child.

It is apparent that this practice involves the subjective judgment of the person who compares the pupil's specimen with the scale. By systematic training, however, many persons can become very expert. Reliability can be further increased by securing the independent judgments of *several* experts.

- QUALITY 4 *seated on the curb was my*
- QUALITY 6 *gathering about them melted away in an instant leaving only a poor old lady*
- QUALITY 8 *moved along down the driveway, the audience of passers-by, which had been gathering about them melted away*
- QUALITY 10 *driveway. The audience of passers-by, which had been gathering about them melted away in an instant leaving only a poor old lady on the curb. Albert was sadly striking*
- QUALITY 12 *lightly into Warren's carriage and held out a small card, John craned behind the bushes and the carriage moved along down the drive*
- QUALITY 14 *Then the carelessly dressed gentlemen stepped lightly into Warren's carriage and held out a small card, I*

FIG. 20. SPECIMENS FROM THE THORNDIKE SCALE FOR QUALITY OF HANDWRITING

The samples are greatly reduced in size and only a few of the specimens at a few of the steps are shown. The original includes several specimens for each step from Quality 0 to Quality 18.

Mixed Tests. Tests, then, may be devised to measure how hard a task one can do, or how many facts or skills one has acquired, or how rapidly or accurately or otherwise excellently one can perform. The speed, range, accuracy, or quality of performance may be measured at any one of several levels of difficulty. Many tests combine measurements of these elements in different ways in order to secure a rough estimate of general

all-around ability. Unless a test measures a single factor, such as speed or difficulty, with the others held constant, it yields only a rough and general measure.

A frequent fault of the standardized and informal test is uncertainty concerning which type of test it really is. For example, it has been repeatedly demonstrated³ that the correlation between level or power of comprehension in reading and speed of reading easy material is not very high and that some of the pupils who get high scores on a level test read easy material very slowly, and vice versa. Unless the examiner knows whether he is testing *speed* or *level of comprehension*, he is unable to make good use of the scores obtained. Indeed, he is likely to be misled if he assumes that the test measures both features or the one which it does not measure. For example, to assume that a high score on a level test means that the pupil is a fast reader may result in the neglect of needed help in increasing speed. This illustrates one of the many points to be considered in determining the *validity* of a test, which will be discussed presently. In general, the examiner should know what aspects of performance or what combinations of speed, level, range, accuracy, or other qualities a test really measures.

THE USE OF DERIVED SCORES AND NORMS

By checking the answers or responses to a standardized test and totaling the scores according to the method prescribed for that test, one obtains a numerical value or *score* usually called the *raw score*. Thus Pupil *A* in grade 4 obtained the following raw scores: Speed of computation in arithmetic, 36; difficulty test in arithmetic, 17; speed of reading, 12; power or level of reading comprehension, 22; accuracy in reading, 82; spelling, 42. These raw scores obviously mean little as they stand. The reader doubtless has no idea whether Pupil *A* is, on the whole, good or poor for his age or grade or in what abilities he is relatively strong or weak. These raw scores can become meaningful only when they can be converted into a common score which permits direct, meaningful comparison of one score with others. Such scores are widely used; they are usually called *derived scores*.

Types of Derived Scores. Most of the derived scores now in use depend upon one of the following three types of comparison:

1. Comparison of a pupil's score with the abilities of average pupils at *different ages*.
2. Comparison of a pupil's score with the abilities of average pupils in *different grades*.
3. Comparison of a pupil's score with the abilities of different pupils of the *same age or grade*.

The score resulting from these first types of comparisons is usually called the *age score*, from the second, the *grade score*. There are many types of scores of the third class, the most familiar of which is the percentile score. The methods of constructing such scores are so technical that no attempt will be made here to describe them. We shall merely try to indicate roughly what each type means.

The Age Score. The principle of the age score for achievement tests is substantially the same as that underlying the mental age scale, previously illustrated in our discussion of the intelligence tests. Just as a score on the intelligence test can be translated into a mental age so a raw score obtained in a test of educational attainment can be translated into an educational age. Likewise a score on a particular reading test can be converted into a reading age. To obtain an educational age of ten years, then, means to have the educational ability of the average ten-year-old pupil; to have a reading speed age of ten years means to be able to read as well as the average ten-year-old pupil.

When the raw scores listed on page 531 are converted into age scores, we get the following:

Speed of computation, arithmetic.....	9.0 years
Difficulty of problems, arithmetic.	10.0 years
Speed of reading	9.0 years
Level of comprehension in reading.....	12.8 years
Accuracy of reading.....	11.0 years
Spelling	12.0 years
Average of the six tests.....	10.6 years

This pupil stands highest in level of comprehension in reading and spelling, lowest in computation in arithmetic and speed of reading, and between the extreme in arithmetic problems and reading accuracy. These facts were not apparent in the raw scores.

The Grade Score. In securing the grade score, the pupil's raw score is converted into an average grade status, instead of an age position. Thus, if a pupil's score in an educational achievement test is equivalent to the average raw score of pupils at the beginning of grade four, this pupil secures a grade score of 4.0; if his score is equivalent to the average score of pupils in the middle of grade four, he will be given a score of 4.5, and so on. To secure a reading grade of 4.0 means to have the reading ability of the average pupil at the beginning of the fourth grade. In passing, it should be said that intelligence test scores can also be converted into grade scores as well as age scores. Thus, to have a mental grade of 4.0 means to have the intelligence of the average pupil at the time of beginning the fourth grade.

Percentile Scores. Various other types of *scores* are in use. In most of them the score is derived from the distribution of pupils of a given age (or grade). In the preceding chapter we found that a group of pupils of a given age (or grade) differ widely in ability. If you have large representative groups of a given age (or grade), the scores vary from very low to very high in a way that approximates more or less closely the normal curve of distribution, which is similar to the curve shown in Fig. 6 (see Chapter VIII). It therefore becomes possible to convert a pupil's raw test score into a number indicating his position in this distribution. The simplest score, mathematically, is the percentile score, varying from the lowest or zero percentile, through the median or 50 percentile to the highest or 100 percentile score. Other scores, derived by more intricate statistical methods, are similar in the fact that they express a person's status in terms of his position in a group, typically a representative group of his own age, or school grade.

Relative Merits of Age, Grade, and Other Scores. The age and grade scores are most widely used in the elementary school work, and percentile and other types of derived scores are more frequently used in high school, college, and, in general, for adolescents and adults. All these scores have the advantage of embodying none but simple conceptions; the average achievement as a basis, and the year or grade or percentile as units or steps. They are readily understood by parents as well as teachers; they are simply and speedily constructed.

Meaning and Significance of Test "Norms." The age, grade, or percentile scores which you see printed in the manuals for educational tests are sometimes called norms. You may hear one teacher expressing satisfaction because his class tested "above the norm" and another voicing dismay because his group fell "below the norm." Every student should understand once and for all that these scores or the tables from which they are derived are "norms" only in a statistical sense; they are arithmetical averages and not ideals. They actually depict not ideal but average attainment. Half of the pupils, approximately, equal or excel these "norms," another half only equal or fall below them. The norms are not in any sense standards of excellences; they are merely standards for comparison. They enable one to compare any particular pupil's attainments with the typical or average achievement. The test "norms" throw no light whatever on the question whether the typical or median achievement in any subject is optimum, too high, or too low.

Misunderstanding of the significance of derived scores and norms has caused much mischief in education. It has led many teachers, often on demand of their superior officers, to attempt to bring all pupils up to the norm, especially in the subjects most frequently tested—reading, arithmetic, spelling, history, and geography. This misuse of norms has been properly criticized extensively in recent years.

Considerable mischief has also resulted from faulty norms, which, of course, produce misleading age, grade, and percentile scores. The scores will be faulty unless they represent accurately what they are supposed to represent. They are usually

supposed to represent a typical or average or representative group of pupils of the age or grade indicated. Often they do not do so because they are based on too small a number of pupils to give reliable averages, or on groups, however large, which are of superior or inferior ability. Sometimes the norms are faulty because of incompetent administration or scoring of the tests or errors in computing the norms. Hence, it is advisable to scrutinize the bases on which the test scores and norms are established.

ESSENTIAL CHARACTERISTICS OF A GOOD TEST

The preceding discussion revealed several necessary features of a good test. In the first place, the standardized procedures for giving and scoring the tests should be clear and definite so that they may be employed by any competent examiner. It should be clear what quality or aspect of performance a test measures—whether level of difficulty, speed, range, accuracy, or some combination of these, or some other quality, such as literary merit in a composition, legibility in handwriting, etc. If a derived score, such as an age, grade, or percentile score is developed, or a table of norms is provided, it should be clear what populations they represent, and they should represent accurately the attainments in that population. Certain other requirements must also be met.

The most important problem is that of securing proper validity in a test. This question was really raised in part in the preceding section, especially in discussing such characteristics as level, speed, accuracy, range, and "qualities." In fact, the following discussion of validity is a further inquiry concerning the determination of the qualities of performance measured by a test. When one raises the question: Does this test measure what the teacher or examiner wants to measure? it is implied that the teacher or examiner knows what he wants to appraise. The question then is: How validly or truly or accurately do available devices measure what I want to measure? And this leads us directly to the problem of objectives in education. It raises the question: What should be measured?

THE CHOICE OF OBJECTIVES TO BE MEASURED

A program of appraisal should begin with a clear and detailed definition of the school's objectives. Schools are attempting to foster growth and learning of many types varying from development of physical vitality, social competence, personality adjustment, desirable attitudes and ideals, emotional balance, intellectual alertness, and sagacity to innumerable more particular understandings, insights, facts, appreciations, techniques, and skills such as those sought in the various school subjects. The school should attempt to measure the extent to which pupils have attained or are progressing toward the attainment of its objectives. The objectives should be set forth first and then means of determining progress toward them should be sought.

Origin of Objectives of Education. Objectives of education originate from different sources. Many come from the philosophy of education, which makes educational objectives its major concern. "Education should foster the democratic way of life" is an example of an objective derived by philosophy from data secured from sociology, ethics, political science, history, and other sources. Other objectives, such as "disciplining the mind," "learning how to think," reflect popular convictions; others such as "learning certain facts in history" reflect the opinions of academic specialists, such as college teachers, in the subject. Many are the direct outcomes of scientific study; for example, the acquisition of certain habits of eating and sleeping or the development of emotional control.

Objectives Should Be Definite. Unfortunately, as Tyler, an active worker in the field of appraisal, declared, "many statements of objectives are so vague and nebulous that, although they may sound well, they prove to be glittering generalities which are of little use in making examinations."⁴ The result was that measurement in education was at first confined too much to the more obvious and tangible objectives, to the neglect of many of the more important outcomes. This was due in part to the inability of the specialist in measurement to find

out definitely what the school regarded as its major objectives. It was due in part to the fact that textbooks and educators have been far from clear and specific even about the facts and skills in the school subjects which they wished to teach and far less explicit about the ideals, attitudes, concepts, generalizations, mental adjustments, social convictions, or "ways of life" which they were attempting to cultivate in various school activities.

During recent years, however, a concerted effort to clarify the objectives of education in the interest of appraisal and diagnosis has been made. Specialists in philosophy are becoming less vague, and "glittering generalities" are giving way to discussions of tangible objectives and practices. Certain sciences are applying themselves to concrete problems. For example, child development, as sketched in Chapters II through VI of this book, is finding more and more exactly what types of behavior are desirable in modern life and how changes in them may be produced and identified. Clinical psychology, as will be shown in later chapters, is giving increasingly clear definition to various types of mental adjustments. The study of learning, sketched in Chapters IX through XV, is resulting in clearer understanding of the processes involved in acquiring information and skill, generalizing, reasoning, inventing. Scientific studies are, in fact, responsible for discovering and defining most of the accepted objectives in the elementary school subjects. For example, scientific research revealed what types of reading abilities and interests were of most practical value, what processes in arithmetic are most useful in everyday life, and what words are most frequently read and written. Until certain studies were made between 1915 and 1925, the teacher could not possibly have known that certain "study types" of reading were quite different from various forms of "story reading," and that several new reading objectives must therefore be set up.

During recent years, progress in defining and describing the objectives of the curriculum in more intelligible form has been paralleled by improvements in methods of measuring and appraising attainments and in diagnosing difficulties, as we shall see in a later section in this chapter.

Tests Should Measure Important Objectives of Education.

The first requirement of a good test, then, is that it shall measure a genuine objective of education. Since time and facilities are limited, the school should use tests to gauge its progress toward its most important rather than its least important objectives. It should in fact seriously endeavor to appraise progress toward all its most important objectives. In this and the following chapter we shall discuss the kinds of attainment for which standardized tests and other devices for appraisal are available. It may as well be confessed at this time that for many important objectives in education no satisfactory standardized pencil-and-paper tests are as yet available.

VALIDITY

A test must have a high degree of *validity* to be useful. A test is valid when it measures truly and accurately the ability or quality one wants to appraise. In education, it is assumed that one wishes to measure the progress in some ability or form of behavior which a pupil has made toward some educational objective. Hence a valid test in general is one which truly and accurately measures the degree of attainment of a specified educational objective. In the case of a published, standardized test the practical question is: Does this test really measure truly and accurately enough for the purpose in hand the ability or quality of performance or behavior which the examiner wishes to appraise? This implies that validity does not operate as an all-or-none principle; it appears in various degrees.

Examples of Invalid Tests. Unfortunately it is often found that a test does not measure what it purports to appraise. A test, published as a measure of ability to compute in arithmetic, turned out to be chiefly a test of speed of handwriting for pupils in grades three and above, because most of them could do the computations faster than they could write the answers. A test of "general science" proved to depend more upon reading ability than upon knowledge of science. Such true-false exercises as "dogs are smarter than cats" possess low validity because they will be interpreted differently by different per-

sons. It is not clear what is meant by "smarter" or whether "smarter" means "in every comparison" or "usually" or "in the average case," etc. An item as ambiguous as this is unlikely to be valid.

The Determination of Validity. The determination of the degree of validity of a test is the most important and the most difficult task of the test maker. Many methods are used and different ones are needed for different tests. Among the most popular methods listed (by Peters and Crossley)⁵ are the following: textbook analysis, correlation with school marks, pooled judgment of competent persons, items selected for difficulty, correlation with previously validated measures, increases in percentage of successes with successive ages or grades, analysis of courses of study, correlation between parts of the test (each part testing for different features), correlation with teacher's rating. For example, a test of knowledge of algebra may be given to a class and the scores correlated with the teacher's ratings or the final grades for a course in algebra. The correlations are not very satisfactory since the validity of the teacher's ratings and grades is unknown. Another method is to correlate the test scores with the results of a much more extensive survey or examination in the same field. Thus, for example, Willing⁶ compared the results of a new test of errors in composition with the errors found in a number of compositions written by the same pupils. He found that the new test had rather low validity as a measure of punctuation, sentence structure, and grammar (correlations below .55), but a fair validity as a measure of the total freedom from a composite of all kinds of errors. In some cases, validity is estimated by determining the correlation of tests with an ability revealed by experimental devices. For example, Cason investigated the validity of several inexpensive methods of appraising ability to read words "in thought units" as contrasted with word-by-word reading, by comparing results on these tests with records obtained by photographing the eye movements during reading by an elaborate and expensive apparatus.⁷ In some instances, the validity of a test is estimated by observing the extent to which pupils increase their scores on

the test during a period devoted to teaching known to increase the ability. Thus Gates appraised certain reading tests by giving them before and after periods of training in which the pupil gained in speed of reading of a special "merely get the main idea" type.⁸

Test Item Validation. A procedure known as "test item validation" is coming into increasing use. It consists in supplementary study of the test as a whole by critical evaluation of each item in the test. Each individual item may be appraised by comparing the pupils' performance on it with their status based on teachers' ratings, school marks, etc., or their performance in a more extensive test, experimental situation, or period of work. Another method is to ascertain the extent to which pupils' performances on a single item in a test compare with their performances on the whole test. This is applying what is termed the "test of internal consistency." On the basis of the data thus secured, the items which agree most closely may be selected and a more homogeneous total test may be developed.⁹

All methods of establishing the validity of a test have merits and limitations. Test validation has become so highly technical a field that a text such as this can offer little more than a suggestion of the nature of the work and an admonition to look to the evidence concerning the validity of a test before leaping to use one.

RELIABILITY

Methods of Determining Reliability. How much will a pupil's score obtained in a test given today vary from his scores obtained on an equivalent test given on each of one or more successive days? This is the question of *reliability*. One way, probably the best way, of determining reliability is to give each of several equivalent forms of a test on successive days and correlate the results. The correlations will indicate the degree of agreement or reliability. Another, easier method is to give only one test, divide the items into two halves (for example, the odd numbered items in one and the even in the other), correlate the "split halves," and use a statistical device to make the cor-

relation comparable to the figure obtained had two full-length tests been used. Psychologically, the latter procedure is less valid than the former because it rarely gives full play to the variations in performance between "good" and "bad" days which result from many influences—differences in fatigue, tension, confidence, distractions, etc.—and which affect different tests differently.

The Essential Degree of Reliability. In general, however, it is easier to determine the reliability of a test than its validity. Authors of published tests are expected to give data indicating the reliability of their tests and to indicate the uses which the figures justify. It is usually considered that the correlations between the scores of two equivalent forms of a test obtained from a fairly representative group of pupils of a given grade should be:

- .90 or higher to give a reliable measure of a single individual in the ability tested;
- .70 or higher to give a satisfactory indication of the *average* ability in a class of thirty to forty pupils.

Since the correlations vary with the range of ability in the group, however, and since the necessary degree of reliability varies with different uses of the test, no single or simple rule can be given as a means of deciding what coefficient indicates sufficient reliability for every purpose. For example, a degree of reliability sufficient for a diagnostic appraisal of status of individuals at the end of each month to be used as a guide in instruction might be too low to serve as a single, final examination in which passing or failing of the term's work would be based. It should be noted also that the reliability of a test depends greatly on how well the tests are given, how well the work of the pupils during the test is sustained, and how accurately the tests are scored. Faulty administration and scoring of tests may reduce the reliability greatly. These facts place a heavy responsibility on the author of tests for making the testing and scoring as objective as possible and for giving full information concerning the uses to which the tests may be put

with reasonable expectation of securing reliable results. It places equal responsibility on the examiner to follow the standardized procedure rigidly. A serious fault in testing, not infrequently found, consists in giving a few extra seconds of time, distracting pupils by comments during the test, giving a child a hint for some reason, or taking liberties with the prescribed directions for scoring items right or wrong. A teacher once told the writer that, in using one of his reading tests, she scored certain exercises correct because "knowing her pupils she felt that certain responses indicated that the pupils understood the material pretty well even when their responses were different from those prescribed as 'correct' in the Manual." Since this was a test of "Following Precise Directions," these liberties completely destroyed the validity as well as the reliability of the test.

ECONOMY AND USABILITY

Tests that measure important objectives of education with high validity and reliability may vary greatly in acceptability. Some may be more expensive than others. The cost of the tests and manuals, however, is usually much less important and variable than the cost of giving and scoring the tests. The print should be clear and of appropriate size for the group. Directions to the pupils should be clear and concise. The development of more objective and expeditious methods of scoring the tests by hand and especially the invention of several types of machines for scoring tests mechanically have greatly reduced costs.¹⁰ Sometimes tests which rank high in these respects are accompanied by manuals which fail to give satisfactory instructions for interpreting results and for improving instruction in the light of the needs revealed. Sometimes the manual accompanying a good test gives distinctly misleading educational suggestions. Consequently, the manual must be as carefully appraised as the tests themselves. If it is planned to give a test two or more times at intervals to measure growth, only tests with a sufficient number of equivalent forms should be chosen.

EFFECTS OF THE EXPERIENCE UPON THE PUPIL

Most educators and specialists in appraisal recognize the importance of the effects of the test on the pupil before, during, and after the experience. Some are genuinely enjoyable, whereas others may produce outright annoyance. Some are intrinsically of high educational value; they teach as well as test. Some permit later analyses which are more illuminating and helpful than others. Such factors as these deserve careful consideration. The examiner should realize, however, that such effects depend greatly on how the test is given, how the teacher reports the outcomes, and what is done with the results.

STANDARDIZED ACHIEVEMENT AND
DIAGNOSTIC TESTS

Nature of Standardized Tests. Standardized tests may be divided into two types: (1) Achievement Tests and (2) Diagnostic Tests. The most widely used type of achievement test is designed primarily to measure the status or attainment in a school subject or activity of an individual or class or a larger group. Such tests may be used for any of the purposes outlined on pages 536-537. Achievement tests in the school subjects are more numerous and more widely used than any other kind. In the early period of the testing movement, a single test was often offered as a measure for "general ability" in reading or arithmetic. It is now recognized, however, that several abilities or specialized phases of ability appear in the educational objectives of most subjects. It is therefore necessary to test each ability separately in order to make possible valid educational guidance. The typical present-day policy is to use a "battery" of tests to secure a rough survey of attainments in the various school subjects and to follow such an appraisal with a more extensive diagnosis of those subjects or pupils, who seem to merit more thorough study.

Nature of Diagnostic Tests. Diagnostic tests consist typically of a series of instruments designed to measure a larger

number of abilities, interests, and performances, often including special techniques, skills, and forms of information essential to success in the subject as a whole. Thus in silent reading, in addition to measuring level of comprehension and speed and accuracy of reading paragraphs of one or more types, tests may be included to measure recognition of isolated words, recognition of phrases, range of word knowledge, skill in phonetic and visual analysis of word-forms, recognition of word-form elements, such as isolated phonograms (th, gr, etc.), syllables, individual letters, and letter sounds. There is, however, no clear line of division between achievement and diagnostic tests. Some achievement tests are diagnostic to some extent. For example, to measure speed of reading easy passages and the most complex level of comprehension is to diagnose reading to some extent. On the other hand, diagnostic tests usually measure achievement in each of the abilities examined. What one finds is a range from very limited to very extensive diagnosis. Important diagnostic insight, moreover, can be obtained by studying the responses to individual items on almost all tests.

The General Achievement Battery of Tests. The "Modern School Achievement Test" is an example of a survey test. It includes tests for each of the following: (1) Reading: level of comprehension; (2) Reading: speed; (3) Reading: accuracy; (4) Arithmetic: computation; (5) Arithmetic: reasoning; (6) Spelling; (7) Health knowledge; (8) Language usage; (9) History and civics; (10) Geography; (11) Elementary science.

In making the tests, specialists in the various subjects endeavored to select as test items the most important of the commonly taught items of subject matter. The test directions were carefully standardized and given to a representative sampling of pupils throughout the country to secure reliable norms. The raw scores may be converted into age or grade scores, and the relative ability of a pupil on the various tests may be intelligently compared. Thus, by giving the battery, which is assembled in a single thirty-two-page booklet, an appraisal of general achievement in the basal subjects is secured. The test provides a "profile" sheet on which a pupil's attain-

ments may be graphically displayed. Fig. 21 gives a graph for a fifth-grade pupil.

Batteries of this type, of which a number are available, measure achievement in the school subjects in a general way.

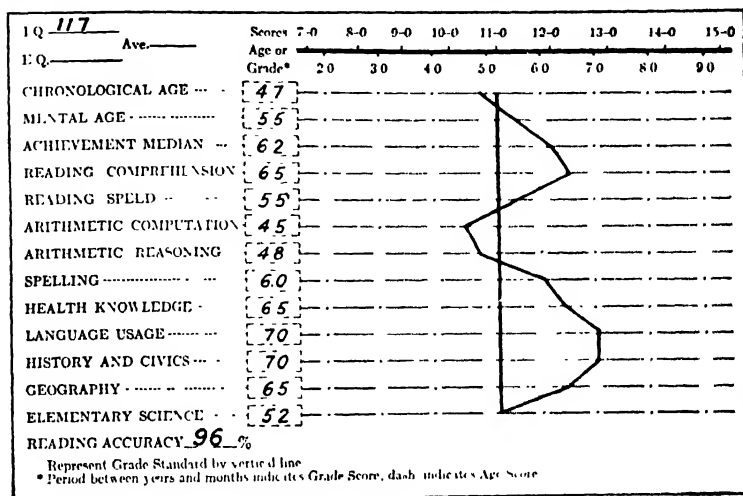


FIG. 21. PROFILE CHART FOR THE MODERN SCHOOL ACHIEVEMENT TEST

This profile is worked out in terms of grade scores. The straight vertical line shows the tests were given when the pupil was at grade 5.2; that is, shortly after the beginning of the fifth grade. The pupil was slightly young for the grade; his chronological age corresponds to a grade of 4.7, as shown in the first horizontal line both by the entry in the column of boxes and by the graph on the profile. His mental age, however, is 5.5. His I.Q. (entered in the top left corner) is 117. The approximate achievement median, that is, a median or average of the grade scores in the various tests, is grade 6.2, which exceeds his age, his mental age, and his grade position. He is, in general, a good student. His attainments are somewhat uneven, however. He is best in language usage, history and civics, geography, and reading comprehension. He is very good in reading speed and spelling, barely average in science; and below his grade and mental age in arithmetic. Specialization in ability of this degree is not unusual.

They reveal approximately "how good" a pupil is in reading, arithmetic, etc. in general. It will be noted that only one test is provided in spelling, health knowledge, language usage, history and civics, and science; two in arithmetic; and three in reading. The age or grade scores do not themselves give specific information about particular difficulties or specialized attain-

ments within a subject. When more than one test in a particular subject is included, however, some diagnostic insight is made possible. For example, the *Modern School Achievement Tests* measure separately Level or Power of Comprehension, Speed, and Accuracy of Reading. By comparing grade or age scores for these three phases of reading, the teacher can tell along which line to guide future instruction. In many of the tests comprising such a battery, additional diagnostic information may be secured by studying the nature of the errors made by a pupil. For example, in the spelling test of the *Modern School* battery, directions are given for detecting a pupil's difficulties by classifying the errors into certain types such as those due to (1) addition or omission of syllables; (2) unphonetic syllables or parts, etc. Since an excess of a given type of error suggests a particular fault in the learning process, the analysis of errors gives the teacher clues for improving his instruction of each pupil.

Methods of Using Achievement Test Batteries. A common practice is to use such a battery once, less often two or more times, during a term, for a general checkup of all pupils in a school system. The superintendent of the system, the principals of the various schools, the supervisors and teachers, get copies of the age or grade scores of all pupils under their jurisdiction. The average attainments of each grade in the whole system, also in each school building and in each class, are computed. The teacher usually receives the test papers of the pupils in his own class, as well as the average of other classes and schools. Further study of the test papers of his own pupils, discussions with other teachers, etc., are then possible and desirable.

Such uses of the general achievement battery are valuable as far as they go. They do not, however, provide all the information essential for complete appraisal or diagnosis. Since the battery is limited to attainments in the school subjects, it must be supplemented by appraisals of many other objectives of education. Since such a battery was made for general use, it does not provide a detailed evaluation of all aspects of the school subjects as taught in a particular class. Finally, such a test itself

is diagnostic only to a limited degree, and more penetrating analyses of a pupil's specific attainments, difficulties, and interests are usually desirable.

TYPES OF STANDARDIZED TESTS NOW AVAILABLE

Standardized Tests Are Available in Most School Subjects. To list the subject matter fields in which standardized tests are available would be to list practically all the subjects appearing in the curriculum from the kindergarten to the most advanced graduate school. Although more tests are available in the basal or "tool" subjects such as reading, spelling, and arithmetic, good general appraisal tests have been developed for such subjects as appreciation of music, dress design, and other fields of art as well as for various skills such as ability to read music or to judge textiles.

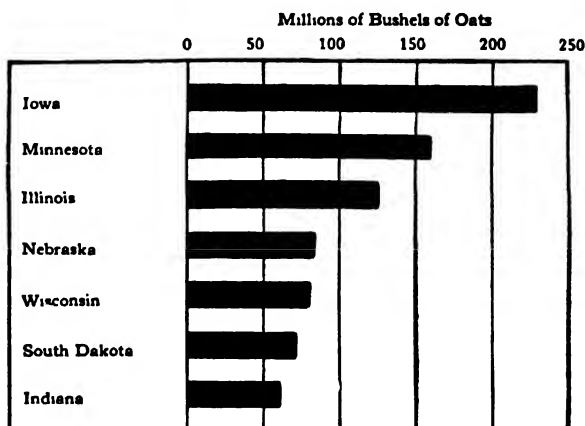
Standardized tests not only of facts and other detailed items but also of ability to use facts intelligently, to make critical appraisals of data, or to apply general principles are available. A few examples of the latter types will be given.

Tests of Critical Thinking. The Wrightstone Tests of Critical Thinking in the Social Studies are an example. They include three types of tests: (1) obtaining facts; (2) drawing conclusions; and (3) applying general facts. They are designed for use in the elementary school.¹¹

Tests of Obtaining Facts. The test of "obtaining facts" provides a measure of a pupil's ability to obtain information from graphs, maps, and tables of the types used in the social studies; to use the index of a typical social studies book; and to locate essential information in books, magazines, and newspapers in a typical library setting. It is not a test of facts previously acquired but of abilities used in acquiring new information. It presumably is an index of skill in using the recognized techniques of study. An example is provided in Fig. 22.

Tests of Drawing Conclusions. The test of "drawing conclusions" requires the pupil to evaluate various conclusions drawn from given data. Inasmuch as all the information is given in the printed material available to the pupil, no recall

of facts is required. The pupil's success with the test depends upon how well he comprehends, infers, and judges from the given social studies data. These data are given in textual,



13. The number of bushels of oats grown in Illinois was about: (1) 125 million (2) 150 million (3) 125 13. ()
14. The state which grew the least amount of oats was: (1) Indiana (2) Nebraska (3) Iowa 14. ()
15. The state which grew the most oats was: (1) South Dakota (2) Iowa (3) Minnesota 15. ()
16. The state which grew about 57 million bushels was: (1) Nebraska (2) Indiana (3) Minnesota 16. ()

FIG. 22. A SAMPLE OF TEST ITEMS FROM THE WRIGHTSTONE TEST OF OBTAINING FACTS

Four problems, Nos. 13 to 16 above, are presented in connection with the graph. The total test includes thirty problems which increase in difficulty and an additional exercise concerning the use of an index, etc.

graphic, and tabular form. The following material, presented to the pupil to illustrate the method of doing the tests, is somewhat easier than the eight problems that comprise the test.

Directions: After you read these directions and understand them you will be told when to begin the test.

Mark with: (+) every statement which is true and can be proved by the facts stated.

- (0) every statement which might be true but cannot be proved by the facts stated.
- (—) every statement which is false as shown by the facts stated.

Sample Question: Knights, or nobles, in the Middle Ages got their lands from their fathers. The lands and servants were passed from father to son. The farmers who used land belonging to a noble had to pay so much that they were always poor. The merchants who sold goods had to pay a fee if they used the roads and bridges on a noble's land or if they used a boat in his stream.

- A. The nobles who owned the land in the Middle Ages made every farmer and merchant pay a great deal to use the land. A (+)
- B. The merchants who sold goods were often rich men B (0)
- C. Merchants and farmers were not under the power of the nobles. C (—)

Explanation: Statement A is a true explanation and can be proved by the facts stated, so it is marked (+).

Statement B might be true but cannot be proved by the facts stated, so it is marked (0).

Statement C is false as shown by the facts stated, so it is marked (—).

Several interesting examples of tests of judgment, inference, and reasoning are to be found in the series of instruments developed by the Committee on Appraisal of the Progressive Education Association for use in its "Fight Year Study" of education at the high school and college levels.¹²

Tests of Applying Principles. Tests of application of principles were developed for various subjects such as science, biology, chemistry, and physics. In each test a problem is presented to the pupil in a printed paragraph. The problem ends in a question of the type "What should be done?" or "Which of the following courses of action should be taken?" Three possible conclusions are given, from which the pupil is to select the one that is most consistent with the facts given and whatever other knowledge he has. Ten to fourteen reasons which might sup-

port the chosen conclusion follow. The student is to indicate those that support his conclusion.

The scores may be analyzed to show:

1. The general accuracy of a student in making appropriate decisions with valid reasons.
2. The number of correction conclusions drawn.
3. The number of correct reasons selected.
4. The type of incorrect reasons such as: Technically false, irrelevant, false analogy, practice, assuming the conclusion, authority, ridicule, teleology.
5. The number of reasons chosen which are inconsistent with the conclusion chosen.

Tests of Interpreting Data. In another test of "interpretation of data" the students are given problems from various fields, accompanied by charts and graphs. After each problem are a number of statements which the pupil is to mark to indicate if the data are:

1. Sufficient to make the statement true.
2. Sufficient to indicate that the statement is probably true.
3. Insufficient to indicate the truth or falsity of the data.
4. Sufficient to indicate that the statement is probably false.
5. Sufficient to make the statement false.

Answers are to be based on the evidence alone. The pupil's responses may be analyzed to show his:

1. General accuracy in judging interpretations.
2. General accuracy in one or more of the five types of response.
3. Tendency to err in the direction of understatement.
4. Tendency to "go beyond the data" (call true a statement probably true, etc.).
5. Tendency to make crude errors in judgment (call false a true statement).

Tests of Attitudes and Interests. The standardized test technique has been successfully applied to the appraisal of interests and attitudes as well as to abilities. The Committee of Appraisal of the Progressive Education Association for example, has developed a very simple test for sizing up the interests of

the high school pupil by presenting him with a list of 200 items each of which he is to mark to indicate whether he likes, dislikes, or is indifferent to it. The list includes such items as:

1. To write stories.
6. To correspond in a foreign language with a student in another country.
32. To play basketball.
39. To set an attractive table for guests.

In a test by Bogardus¹³ the "social-distance" technique is used in which the subject states whether he would accept a certain kind of person as a citizen, as a neighbor, or as a member of his family. This method gives an apparently valid measure of social prejudice.

Standardized Tests of Personality Traits. The standardized test technique has been employed with some success in the appraisal of various areas of personality development. Such tests may be used to size up individuals at any time and to appraise the effects of school and other experiences employed to secure improvement. Such tests are considered in the next chapter and in Chapter XX.

Merits and Defects of Standardized Tests. Standardized tests have certain obvious merits—convenience, ease in scoring, the provision of the "norms" for use in interpreting results, the possibility of comparing individuals and groups with each other, the value of knowing the reliability of the score, the high validity which may be secured by thorough study of the test before publication, and the values of enjoying the results of the experiences of other persons who have used the same test. The criticism that standardized tests too often measure trivial details or facts is a criticism of test-makers rather than of tests. New ventures have shown the applicability of the standardized test technique to a wide range of educational outcomes. Standardized tests, however, cannot be secured to measure every aspect of every teacher's program. It is, therefore, necessary for a teacher to supplement the published standardized test with instruments designed to appraise abilities not

measured by them at present and to meet local and special needs in the same fields now covered by them only in a general way. One of the methods of fulfilling this purpose is to construct "informal" or "teacher-made" tests similar in design to the standardized instruments.

TEACHER-MADE OBJECTIVE TESTS

Comparison of Teacher-Made and Standardized Tests. The teacher can embody the content in which he wishes to examine his pupils in practically all the types of tests employed in standardized instruments. Commonly used forms such as the true-false or yes-no tests, the multiple-choice test, the matching test, the single-word answer, and various problem tests have been illustrated in preceding pages. Research by specialists has made available many particular rules to be followed to secure the best results from each of many types of tests in the construction of teacher-made as well as standardized tests. Indeed, it should be realized that the construction of home-made tests should be guided by the same principles as the development of standardized tests and is subject to the same difficulties.

Requirements of the Teacher-Made Tests. Home-made tests, consequently, should measure the outcomes regarded as most important; that is, they should harmonize with the teacher's philosophy of education. They should also be based upon the type of mental processes regarded as important. For example, if the teacher wishes the test to bring into action certain types of thinking or generalizing, he should be sure the test is not merely a measure of memory for detailed facts or of recall of certain general statements. Informal tests, like standardized tests, require items of high validity. A teacher-made test, moreover, should have the reliability essential for its purpose. If a teacher is to avoid deceiving himself and misleading his pupils, he must be as careful about the reliability of tests of his own construction as of tests he purchases. The reliability of published tests of similar character to the ones he is developing may be studied for suggestions concerning the number of

items likely to be needed to attain a desired degree of reliability. The teacher should understand, however, that the quality is far more important than the number of the items. In many instances he should be prepared to determine the reliability of his tests or to secure the services of someone who can do it for him.

Following are a few practical suggestions which have been derived from studies of test items.

The Item Should Be as Clear and Direct as Possible. Complex, lengthy, involved statements may obscure the real issue. The point of the problem must be clear to the pupils.

Irrelevant Clues to the Correct Answer Should Be Avoided. For example, note the following test:

An adjective is a part of _ _ _
ship speech automobile book

This item can be figured out by means of several irrelevant clues. For one thing, "speech" is the only word that makes a complete sentence without using "a" or "an." The omission of the article gives the test away. Even if the choices are made *a ship, speech, an automobile, a book*, the vaguest recollection that *adjective* has something to do with the English class is sufficient clue to solve the test item.

Students learn to spot recurring clues in objective tests. For example, true-false test items containing the word "always" or "never" are more often wrong than right; those containing "often," "sometimes," etc. are more often right than wrong. *Double negatives* are likely to result from desperate efforts to develop false statements. All such clues should therefore be avoided.

The Type of Exercise Best Suited to the Situation Should Be Selected. Many studies have been conducted to determine which of the commonly used types of items, multiple-choice, completion, etc., are best in general. The evidence is that there are, on the whole, no important differences in general merit.¹⁴ Some persons, apparently, are more adept in developing good items of some types than others. Each type is susceptible to cer-

tain misuses more than others, and each seems to be more adaptable to certain purposes than others. Special texts on the development of teacher-made tests consequently give detailed statements of the major uses and limitations, and a list of special rules and suggestions for the construction of each type.

Even when these principles are followed, much depends upon the individual teacher's ingenuity and critical sense. There are, however, various tests which may be applied to distinguish the poor from the good items. By using such checks, the teacher can learn to make better tests in less time than would be possible if he continued on his way uncritically. Some of these techniques will now be considered.

After the individual items are prepared the test should be assembled and studied as a whole. Following are a few of the important principles to observe:

Tests Items of Similar Kind Should Be Grouped Together.

If the test is to measure several types of response, such as familiarity with general concepts or ability to apply concepts, the items for each purpose should be grouped together. If, in any one test, different types of test exercises—multiple-choice, matching, etc.—are used, it is better to group them than to have them mixed.

Duplicate Items Should Be Eliminated. It is better to cover a wider range than to pile up essentially similar problems on fewer points.

The Difficulty of the Items Should Be Studied. In a test of achievement in a content subject, the items will usually vary in difficulty. To measure a typical class, it is necessary to have a range of difficulty from items which 85 or 90 per cent of the group will fail to items which only 5 or 10 per cent will fail. It is advisable to arrange the items at least roughly from the easiest to the most difficult. The optimum difficulty for the test as a whole is one which produces an average score of about 50 per cent correct.

The Assembled Test Should Be Compared with the Outline or List of Objectives to see whether all important areas are sampled without undue piling up in some of them. Usually

the distribution of the items should correspond at least roughly to the emphasis given to the various areas in instruction.

Precise Directions for Giving and Scoring the Tests Should Be Prepared. Great importance should be attached to the clearness and definiteness of the directions. The time to allow for the test may be estimated. It may be extended (or shortened) when the test is given if a liberal period is provided. The scoring key should be prepared and rechecked. If possible, the teacher should have another person take the test to check the scoring key. With very few exceptions the most simple and satisfactory method of scoring is merely to compute the total number of *items right*, except perhaps in the alternative-choice type of exercise. Even in this type of exercise—in which a pupil will get approximately half the items right by “guessing,” scores which make allowances for chance successes—such as the right-minus-wrongs method—add but little to the usefulness of the results, and test specialists are not agreed on whether the more time-consuming—and error-producing—procedure is worth the time it takes.

It is apparent that most of the preceding steps are subjective; the test-maker is exercising his own judgment with little objective testing of his test. After the test has been given, certain checks should be made especially in the case of tests which may be used with other groups or with the same group later.

The Distribution of Scores and the Average or Median Score of the Class Should Be Noted. The most desirable average score, as stated above, is about 50 per cent correct. The poorest pupils should get very low scores but not zero scores; the best should get most but not all the exercises correct. Pupils who get all the exercises correct are probably not properly measured.

The Items which Disagree with the Trend Should Be Noted. The scores on the individual items may be determined and those in which a number of the pupils with the lowest total score equal, nearly equal, or exceed the pupils with the highest total scores, and vice versa, noted. Usually the test is improved by eliminating these items which are inconsistent with the

test as a whole. In general, the items should be chosen which discriminate most clearly between the best and the poorest pupils.

Comments of Pupils Who Took the Test Should Be Secured. By encouraging the pupils to express themselves freely about the items, one may uncover many unanticipated weaknesses and defects. A teacher should promptly eliminate items which prove to be ambiguous or otherwise defective. The evaluation of test items by the pupils is often a very valuable experience for them. It improves their attitude toward tests; they appreciate fairness and reasonableness in a test as in any other situation.

In Some Cases Results of the Test Should Be Compared with Other Criteria. When a test is prepared with the expectation that it will be used again on other classes, a higher degree of validity and a more adequate degree of validity may be secured by using some of the devices employed in evaluating standardized tests on pages 538-540.

In general, then, the teacher-made tests should be developed by means of the principles revealed by research to be the best guides in the construction of standardized tests. The teacher-made test escapes none of the technical difficulties encountered by the test specialist. The main advantage of home-made tests is that they may be developed to fit local needs more exactly than ready-made commercial tests. They can be developed to test the particular objectives which the teacher is himself trying to attain. If they do this successfully, they are more diagnostic than any standardized test is likely to be. For this reason, teacher-made tests are especially useful in assisting the pupil to evaluate his own achievement, discover his own strengths and weaknesses, and set up his own objectives.

THE ESSAY EXAMINATION

An essay examination is one in which the pupil writes "essays" on questions or topics presented by the instructor. Studies of various types of essay examinations have revealed several of their weaknesses and good features.

Values and Limitations of the Essay Examination. The essay examination compares unfavorably with the various new-type objective tests as a means of surveying mastery of facts in a field. In a given period of time most essay examinations cover only about a quarter as many items of information as objective tests.¹⁵ The older type of essay examination, moreover, usually tested more recall of facts. Even when the examination included a larger number of items, and students were directed to make their answers as brief as possible, it proved to be inferior to the new-type tests.

The chief value of the essay examination lies in its use as a basis of appraisal of skill in summarizing, outlining, organizing, evaluating, or applying information rather than in recalling facts. It is, however, rarely as useful a device as the multiple-choice for testing ability to make sharply pointed interpretations or applications to a particular situation. This is largely due to the fact that fewer situations can be presented, since it takes far more time to write a discussion than to indicate a choice by making a simple mark. But when ability to marshal data in the form of a summary or outline, or to create a defense of a position, or to organize arguments or develop a new application or evaluation of a proposition, is the skill one wishes to measure, the written composition type of response is the most direct and valid test. It is, in certain cases, such as English composition, the only test. When used as a test for such abilities the essay has instructional as well as diagnostic and appraisal value, provided, of course, that the teacher's grading is valid.

To make the essay examination of greatest value, three requirements should be met: first, the examination should be used as a means of teaching as well as testing; second, the grading of the test must be valid; and third, the grading must be intelligible to the pupil. The first requirement depends in large measure on the second and third.

Faults in Grading Essay Examinations. Certain faults in grading may be eliminated. One fault consists in giving weight, intentionally or unintentionally, to irrelevant factors. If the examination is designed to test legibility of handwriting, or

accuracy of spelling and punctuation, these factors should be taken into account in grading the paper, but if the purpose is to evaluate the quality of the thinking on an issue in the social studies, such factors are largely irrelevant. If the teacher desires, he may point out such errors but he should disregard them in arriving at a grade.

The teacher may reduce the influence of certain other factors which affect appraisals unfavorably. Stalnaker found, for example, that the rating given a paper depends considerably on contrast with the examination read immediately before. "A *C* paper may be graded *B* if it is read after an illiterate theme, but if it follows an *A* paper . . . it seems to be of *D* calibre."¹⁶ Standards, moreover, are likely to shift from time to time, hence it is undesirable to read a fraction of the papers at intervals. Judgment is likely to be affected unfavorably by knowing the author of an examination owing to the subtle influence of one's impression of his general competence. Unreliability is increased by considering each person's total examination at a time rather than appraising one question for all the pupils in sequence. Errors are increased by attempting to grade the papers too finely, as, for example, by attempting to grade them into ten or more steps. Optional questions increase the difficulty of grading by requiring a comparison of different areas and issues.¹⁷ Finally, grades based on one reading are less reliable than ratings based on a first reading and a review.

Methods of Improving the Grading of Essay Examinations. The validity and reliability of grading essay examinations will be increased by adopting such steps as the following:

1. Have each pupil write his name in an inconspicuous place on the paper, or use a code system to avoid easy identification.
2. Read the responses of all pupils to one question without interruption.
3. Place the papers in about five piles representing levels of merit. In a typical class there should be about 10 per cent in the highest and lowest pile; about 20 per cent in the next to the best and next to the poorest; and about 40 per cent in the middle or average group.

4. Reread the answers to these questions and shift those papers which seem to be out of place.
5. Record the position of each pupil's paper, using five for the top position, four for the next, etc.
6. Repeat steps (2) to (5) for each question.
7. Add the scores for the several questions to secure the total score.

Using Essay Examinations to Foster Learning. When essay examinations are validly and reliably graded, they can be used effectively to help pupils improve their skill in writing summaries, outlines, evaluations, arguments, and other types of compositions. The teacher should therefore attempt to reveal to the pupils the important defects and merits of their papers. If this is effectively done, the student's method of study should improve. Students are adept at learning to study in a manner that yields the best results on examinations. For this reason the character of the examination and the teacher's appraisal of it are of marked educational importance. Skillfully employed, the essay examination may be made a useful teaching device.

By no means all the data useful in appraising attainments in school work and especially in diagnosing special difficulties are revealed by standardized or teacher-made objective tests or by these combined with essay examinations. We shall therefore consider other devices.

ANALYSIS OF ERRORS

In discussing informal and standardized tests, it was pointed out that study of the child's responses often enables a teacher to note the number and type of errors made. In certain areas, more thorough study of errors is desirable as a means of securing clues concerning misunderstandings, prejudices, inappropriate techniques, and other defects in procedure.

Value of Norms. In some instances, it is important to note the extent as well as the kind of error. For example, first grade teachers are concerned about the "reversal error" made by children in the initial stages of reading. This error, which a child reveals by mistaking the printed word "saw" for "was," or "on"

for "no" suggests failure of the pupil to follow the rule that words must always be observed from left to right and never in the reverse direction. However, errors of this type are made by practically all beginners, and, with decreasing frequency, they appear for several years. For diagnostic purposes, it is therefore important to know how pronounced the tendency is. This may be gauged by standardizing a test situation and the responses to it. Thus, for some of the *Gates Reading Diagnostic Tests* which contain a number of reversible words, norms or standards for reversal errors were developed. For one test, the Oral Context Test, for example, the examiner notes the total number of words mispronounced and the number of reversal mispronunciations. For the child who makes twenty-six mispronunciations, the average number of reversals is three. Three or fewer errors is "normal"; four or five is slightly large; and six or more suggests the need for definite attention.¹⁸

Examples of Areas for Error Analysis. The study of errors in speech, composition, spelling, arithmetic, and many other activities has been pursued sufficiently to provide valuable assistance to the teacher. The reports or manuals dealing with analysis of errors often call attention to types of errors that might otherwise not be observed and suggestions for replacing the inappropriate techniques by better ones. Since recent investigations have shown that many of the most serious "disabilities" are the result of permitting unnoticed errors to become habitual, the discovery of errors at the time when they can be nipped in the bud becomes an important part of the program of appraisal in education.

OBSERVATION OF ACTIVITIES

Observation of Activities Involved in School Subjects. Many forms of educational attainments reveal themselves in some form of *activity* or performance. For some activities the best appraisal is a description of the activity itself. For example, in addition to having a record of the speed of reading, it may be important to know what kind of movements the eyes make during the reading. There are several ways now available for

observing eye movements in reading. One is to secure a continuous photograph of a ray of light reflected from the surface of the eye while the child reads a few lines. This record shows the number of times the eye jumped and stopped per line, how much time (in hundredths of a second) was spent at each stop, how well the eyes were coordinated in their movements, and other facts of importance. When such an instrument is not available, it is possible to observe certain features of the movements by looking directly into the reader's eyes, over the top of the page being read. In this case, the number of stops can be noted, but the duration of each cannot be determined. Only very marked breaks in eye coordination can be observed. Nevertheless, one can learn to note important aspects of an activity as subtle as the eye movements in reading. The qualities of oral reading or singing or debating are examples of characteristics worthy of expert observation. In these cases, the pupil may be observed directly, and his voice may be recorded for further study. Ability to observe effectively may be increased by comparing notes with other persons who observe the same performance, especially if one (or more) is an expert. "Check lists" consisting of a series of descriptions of common characteristics are often provided to assist the examiner to learn to observe shrewdly. A teacher's ability to observe the important aspects of an activity, and to evaluate them will improve, like a physician's diagnosis, with experience. The ability to see much and see it clearly in children's activities is an important phase of the art of teaching for which no objective pencil-and-paper test can be substituted. This topic is, indeed, so important that the next chapter will be largely devoted to it.

THE DIAGNOSTIC INVENTORY

As research advances knowledge of the factors involved in learning in each area, specialists have tended to develop organizations of devices of appraisal termed the *diagnostic inventory*. The purpose of such an inventory is to help the teacher or a specialist secure deep insight into a pupil's work. Such an inventory includes an outline of the specific information to be

sought and instructions for using tests, instruments, observations of performance, analyses of errors, inventories of habits and activities—in short, for employing all available devices—for making a thorough diagnosis. The diagnostic inventory is intended primarily for use in keeping tab on the important aspects of the progress of a pupil. When the teacher checks up carefully on his pupils at short intervals, he will readily spot the prospective “disability” case before he becomes a serious problem. A major purpose of the careful, detailed inventory is the prevention of disability and the saving of the far more difficult and expensive remedial work which results from inadequate awareness of difficulties in the making.

An Example of a Diagnostic Inventory. As an example of a diagnostic inventory in reading, a few sections of an outline of items examined at the primary level are reproduced.¹⁹

Outline of Items Considered in an Appraisal of Reading Ability

1. Background skills

- a. Understanding of words (using oral vocabulary tests, such as Stanford-Binet or group reading-vocabulary tests).
- b. Understanding of sentences, paragraphs, and shorter units (using standardized or informal oral tests).
- c. Ability to understand class discussions (using observations and ratings).
- d. Ability to cooperate in class discussions (using observations and ratings).
- e. Voice and speech habits (using observations and ratings)
- f. Ability to handle books, pencils, materials (using records, informal tests, and questionnaires).

2. Word-mastery skills

- a. General status represented by age or grade or other standard scores (obtained from standardized tests) in such abilities as:

Level and accuracy of silent word recognition.

Level and accuracy of pronunciation of isolated words.

Level and accuracy of recognizing and pronouncing words in oral reading of sense material.

- b. Methods employed in word mastery (discovered by observation and by analysis of errors, using such tests as above) to determine:

Use of context clues.

Attention to visual form of words as wholes.

Attention to syllables and phonograms.

Attention to letters.

Attention to miscellaneous details.

Parts mainly noted—beginning, middle, end, whole word.

Attention to sound characteristics of words; detects and sounds mainly syllables, phonetic elements, such as *n*, *th*, individual letters, various elements.

- c. Characteristics of the pupil's word analysis (discovered by observation and by standardized or informal diagnostic tests) to reveal whether pupil uses quick and superficial or slow and laborious procedures.

Tries persistently or gives up quickly.

Tries different units, or sounds, or devices, or varies little from first response.

Sounds elements too independently or readily fuses them.

Easily satisfied with any result or critical of results and willing to try again.

Forgets to use context clues when studying word forms or combines use of context and word-form clues

Shows evidence of faulty directional orientations, resulting in reversal errors, confused order of parts.

Shows zest in word analysis or appears tense, or bored, or annoyed.

THE SPECIALIST'S CASE STUDY

The Case History. A teacher who uses such devices as have been mentioned, especially one who conducts systematic diagnostic inventories, is really making a "case study." In general this term merely refers to a comprehensive study of a single individual. This is the physician's work. He makes a case study, ranging from a very thorough to a superficial one, of each

patient and he usually records the items on a card. As they accumulate with repeated visits, they comprise the "case history." It includes the important results of tests and observations, the diagnoses and the treatments applied. It is likely to include notes about the patient's past history as well as his present life. It is essentially a diagnostic inventory including items of importance from one's past. In all general features, the good teacher's technique is similar to that of the physician—at least this is true of the teacher who seriously studies the individuals in his class.

Good teachers, like good general medical practitioners sometimes find individuals whose problems (or talents) are so exceptional as to make it advisable to call upon other specialists. Although education has lagged behind medicine in specialization, recent developments are producing persons more expert than teachers in certain areas, and effective cooperation between them is beginning to appear.

The Clinical Case Study. By the "specialist case study" (often called the clinical case study) we merely refer to the most intensive and thorough study of a pupil which science makes possible at the present time. In the typical instance, the case study is undertaken when the teacher feels that a pupil's problems are so subtle and involved as to require the attention of specialists. The major problem noted by the teacher may be a serious and persistent "disability" in reading, spelling, arithmetic, or some other subject, loss of interest, an emotional disturbance, an unusual social attitude, or any one or more of many other symptoms. Much less often—far too infrequently indeed—the specialist is called upon to advise concerning a striking special interest or talent such as a phenomenal memory or insight, or extraordinary inventiveness or originality, or an intense interest in some area.

The Case Study of "Special Disabilities." The special disabilities may be the result of relatively specific mistakes or deficiencies, or they may be the outcome of far-reaching organizations of the individual's experiences and equipment. Special gifts may represent relatively narrow sources or be expressions

of the "person as a whole." In any case, the diagnostician is likely to profit by the contributions of various specialists. Many cases, indeed, will tax the combined resources of a group of the best equipped specialists. A reading disability, for example, may require the attention of the general physician, the eye and ear specialist, the clinical psychologist or psychiatrist, the specialist in intelligence and aptitude testing, and others in addition to the reading specialist who is expert in analyzing the reading techniques of the pupil and the methods and materials employed in teaching him. In particular, the case study demands a thorough survey of the pupil's history in home and school. The pupil's present and past relationships to his parents, his brothers and sisters, his out-of-school playmates and activities as well as his past and present relationships and activities in school are important. A full and clear report of a pupil's life is always useful and often indispensable for a valid diagnosis and remedial program.

The child who is educationally or socially maladjusted corresponds to the child who is physically ill. The consequences of the former are often more serious and persisting. They are, perhaps, on the whole less likely to cure themselves or to respond to simple home remedies. They are certainly much more likely to be mistakenly regarded as "oneryness" instead of illness. That development of greater skill and insight in dealing with such educational, vocational, and social disabilities, and, it is hoped, with special talents as well, will become a major purpose of research in the immediate future seems practically certain. This will be a development of appraisal in a larger sense than mere testing of specific attainments in the school subjects. Important progress has already been made in certain areas to which several following chapters will be devoted.

SUMMARY AND CONCLUSIONS

Educational values of appraisal. If education is to improve its efforts to attain its many and increasingly complex objectives, it must develop comprehensive and valid programs of appraising its products. Maximum improvements in teaching

cannot be achieved in ignorance of the changes produced by the innumerable materials and procedures employed in the profession.

It was implied in our discussion that the starting point in any program of appraisal is the rounding up and clear definition of the objectives sought by the school. These objectives must be analyzed and reduced to definite descriptions of the abilities, interests, and attitudes which the school aims to help the pupils acquire.

The Choice of Methods of Appraisal. When the objectives of education are thus definitely understood and detailed, one should select the most promising methods and devices for appraising the pupil's progress toward them. In some instances standardized objective pencil-and-paper tests provide the best measurements, especially of the more obvious objectives of the school subjects. Often, however, teacher-made objective tests should be used to supplement or even to supplant the published standardized tests. For many purposes moreover, other types of appraisal based on observations, questionnaires, inventories, case studies or other means are necessary. Certain additional procedures will be considered in the next chapter.

Individual Differences in Skills in Using Various Methods of Appraisal. Certain guiding principles are available for evaluating all types of devices for appraisal. It cannot be said that any one device is best for all purposes or for all persons. The ability to make critical use of the major concepts of the physical sciences can be tested in several ways. Some persons are so clever in developing test items and test situations as to be able to improve on any standardized test available, but others are far less ingenious. Each teacher should therefore learn to evaluate his own methods of appraisal by applying the general principles of guidance in test construction to his own work.

The Test of Validity. Most important is the test of validity. It is futile—indeed, it may lead the teacher astray in his teaching—to use any method unless it appraises the ability the teacher wishes to evaluate. The test or appraisal method to use

is the one, other things being equal, which gives the optimum degree of validity for the purpose in hand. The test of validity should be applied to informal, teacher-made tests and examinations as well as to standardized instruments. No greater mistake could be made, for example, than to substitute an essay examination for a standardized test merely because the established validity of the latter is not markedly high. The validity of the appraisal based on the essay might be much lower.

The Test of Reliability. A second important test is embodied in the principle of reliability. Observations or tests or ratings may be of the proper type but too limited to give reliable results. If repeated on another day, the appraisal might indicate a quite different status for many pupils. It is therefore essential to see to it that the appraisal is sufficiently reliable or stable for the purpose in hand. This test of reliability should be applied to error analyses, ratings, and observations, as carefully as to pencil-and-paper tests.

Other Tests. Finally, the cost and convenience of the method of appraisal, the time required of teacher and pupils, the educative values of the test experience itself, should all be weighed before a choice is made.

QUESTIONS AND EXERCISES

1. From your own experience as a teacher, or a student, or both, give evidence of the unreliability of the grading of examination papers. If possible, cite the various factors which influence the examiner's judgment.
2. How would you plan an objective test for this chapter? Outline the various steps you would take and the various things you would do. It would be an interesting exercise for all the students of the class to make up and compare an objective test of, say, thirty items for this chapter. How would you proceed to find out which of these various tests had the highest reliability and the greatest validity?
3. What precisely is the difference between validity and reliability?
4. To what extent is the scoring of a "simple-recall test" subjective? How could the scoring procedure be made more objective?

5. How would you construct an age score for speed of running the 100-yard dash?
6. Summarize the reasons for having a very clear conception of the objectives of teaching before a program of testing is developed.
7. For a course in educational psychology what types of examinations do you think would be best? Why?
8. What are the main merits and defects of tests such as the Wrightstone Tests of Critical Thinking in the Social Studies?
9. Summarize the main criticisms to be made of a school which relies entirely upon standardized objective tests for measuring achievement. Also summarize the main criticisms of a school which employs only teacher-made objective tests.
10. If possible, secure some samples of standardized or teacher-made tests and evaluate the items in them in accordance with the suggestions offered in the chapter.
11. It would be interesting for students to do a little experiment designed to reveal the validity and reliability of their ratings of an essay examination. Types of such experiments are suggested in the text of this chapter.
12. Can you mention some of the uses which might be made of good test results in addition to those mentioned in the present and preceding chapters?
13. John Doe is 10.0 years old; his mental age is 11 years; his reading age is 9.0 years; his spelling age is 9.5 years; his language usage age is 10.0 years; his arithmetic age is 14.5 years. Compute John's I.Q. and diagnose his educational accomplishments and peculiarities as far as is possible from these data. If John's teacher had asked you to study this boy because, as she reported, "There is something funny about his work in school," what further data would you attempt to get and how would you go about getting them?
14. In schools, as you know them, what do you consider to be the main fault—testing more than is necessary? testing less than is advisable? testing the wrong things? unreliable tests and examinations? failure to make constructive use of the results of tests? Suggest other faults that occur to you.
15. What suggestions would you make for improving the program of testing and evaluation in the school you had in mind in answering the preceding question?

CHAPTER XVII



APPRAISING THE SCHOOL PROGRAM THROUGH STUDY OF PUPILS AS PERSONS

To evaluate all phases of their work teachers need a good deal of information about the personal characteristics of their pupils. This is especially true, as noted in the preceding chapter, when the school aims not simply to give instruction in the three R's but aims also to help each pupil, as far as possible, to realize his potentialities as a person—to develop his mental abilities, his ability to master and enjoy arts, crafts, and various skills that are useful in everyday life, his ability to get along with others and to get along with himself.

Since each person has his own pattern of traits it is necessary to study the characteristics of individual pupils in order to appraise the progress each one is making. The present chapter will give an account of additional methods that can be used to find what is happening to pupils as they make their way through school. Chapter XXI also deals with ways of studying pupils but more particularly from the point of view of special guidance work.

STUDY OF PUPIL BEHAVIOR IN THE MODERN SCHOOL

Before we examine specific methods that can be used to get information of a rather personal sort, some attention should be given to the context in which these methods might best be used and the place they should have in the teaching situation.

Study of Pupils as an Integral Feature of the Teaching Process. First let us note that when we study the behavior of pupils in order to evaluate the policies and practices of a school we need information not only at the end of the school term but also along the way. To get an idea of the value of what was

taught, or the success of the teaching, we must have an idea as to what should or might be taught. We need, from the beginning, and during the process, as much information as we can get concerning the pupils' competence and adjustments, the things they have already learned and the things they still need to learn in order to deal effectively with situations which face them in their everyday lives. In other words, the study of pupils as persons becomes not simply a check-up at the end but an integral feature of the teaching process.

We might also note that when in this chapter we include certain methods that have not yet come into general classroom use we are not assigning a new duty to teachers. Such methods are merely a supplement to procedures teachers are already using. All teachers are in the habit of studying their pupils. Such study has always been an important part of a teacher's job, although the fact has not always been clearly recognized.*

Indeed, some of the teacher's most effective work is done when he is not teaching at all in the conventional meaning of that term, but is operating in his role as a student of human nature or is drawing upon his findings. The odd moments he spends in chatting with a shy child before class, or in discussing a nature trail which one of his pupils is building during week ends, or in trying to find the reason why a certain pupil seems to bear a grudge, or in calling a mother's attention to qualities in a pupil which the mother may have underrated, may achieve something that is worth far more in the education of the children concerned than what he does in connection with a routine class recitation.

The Influence of the Teacher's Attitude. The attitude of the teacher will have an important bearing on the kind of information he obtains from his pupils. In trying to under-

* Teachers often have to do some of the work involved in such study as an extra job, as when, for example, they write out their records, or visit a pupil's home in order to get and give information when they presumably are off duty. It would probably add much to the quality of teaching and to the morale of teachers if all schools could adopt a policy, now in effect in many, of setting aside time for such work and definitely recognizing it as work for which the teacher should be paid.

stand a pupil it is important not to let one's own feelings intrude. One must view the pupil's behavior in terms of what it means to him, how it functions in his life and affects his well-being. In approaching a pupil to get information one must come as a learner, not as one who sits in judgment.

Let us look at an example. Through an informal interview a teacher discovers that a certain child shrinks from talking out in class for fear that he will be laughed at. The fear may seem foolish, but the thing to recognize is that the child is afraid. He is not afraid for the fun of it. To accept the fear in these terms will also influence the teacher's technique of dealing with it. He will not glibly tell the youngster that there is nothing to be afraid of—that would do no good and might do harm—but try to learn more about the nature and cause of the fear.

Again, in response to a questionnaire dealing with emotional adjustments a certain pupil reveals that he thinks everyone is unfair to him. Let us say that he is a rather unpleasant child and perhaps it is no wonder that others dislike him. But regardless of the justice of his complaint, we must accept the child's feelings in the matter as a starting point and recognize that this fact is important from his point of view, in order to make good use of the information we have gained and in order to take the next step with him.

To obtain and properly to utilize information about others, it is also necessary for a person to try to recognize attitudes and habits of thinking of his own that might make him look for certain facts while ignoring others, or that might prejudice his interpretation of what he learns. A person may have a mental set against pupils with certain traits or habits or backgrounds. There may be certain skills and achievements which he regards as especially valuable not because they are so inherently but because he has learned so to regard them.

There is no way, of course, of being completely wise to prejudices that lead us to prejudge rather than to make an impartial approach to the study of the potentialities and limitations of a group of pupils. However, to recognize that one is subject to such bias can help to safeguard against it, and a

policy of studying each pupil's qualities and traits in terms of the well-being of the pupil himself also is a good safeguard.

Selection of Methods in Terms of Underlying Objectives. Methods of studying children have value only in relation to objectives which a school is trying to achieve. A clear objective is necessary not only to select proper methods from among those that are available but also for revising or changing a certain method in order to adapt it to a particular purpose. A standard check-list of children's interests, or a certain questionnaire dealing with emotional problems, might be used as a model for constructing a new device suited to a particular end.

The value of a well-thought-out purpose is underscored by the fact that no tests exist for appraising many of the things modern schools are trying to achieve. This fact should not be discouraging. If the purpose of a project is clearly formulated it will be possible to identify some of the concrete gains in achievement or appreciation, or changes in attitude, that should result if the teaching is successful. The more clearly defined the project is, the easier it should be to find or to construct a device for evaluating it.

Cooperative Effort is Essential. An effective program of studying pupils would, in most situations, require a good deal of cooperation.

It is important to have the cooperation of the pupils. No child should be put in the position where he grudgingly gives information about himself, his family, or his friends. Moreover, in some situations pupils can help in suggesting test items or criteria for use in appraising their attitudes, interests, or performance.

The cooperation of parents usually will also be needed. There are things we may wish to know about a child in order to discover his aptitudes or in order to understand his behavior, that can be obtained only through the help of his home. Having learned about him, there are many things we might want to recommend for a child that we can carry out only through the cooperation of his home. Besides, the feelings parents have against unwarranted interference should be respected.

The cooperation of fellow-teachers and other members of the school staff may be very important, too. Usually much can be learned from former teachers of a child, not only with respect to his past behavior, but with respect to ways in which his present teacher might proceed to learn more about him. The judgment of other teachers may be helpful in the choice of methods of gathering information, and also in the interpretation of what is found. Some kinds of information can best be gained by cooperation between teachers who interchange or observe in one another's classrooms.

Use of an Experimental Approach. No matter how much a person might know about the methods of getting information from children, a certain amount of learning is usually involved in finding out the best way to apply these methods. When a teacher alone or with others sets out to get information about any given aspect of behavior he will be wise to proceed on an experimental basis. The study can be started on a limited scale, methods can be tried out in preliminary fashion, and then further steps can be taken in the light of the findings as they emerge.

When an original study of any aspect of human behavior is undertaken it usually requires a certain amount of exploring at the start, whether the person who does it is an experienced research worker or a modest beginner. It is important for teachers to realize this fact.

OBSERVATION

A teacher constantly acquires a large volume of information from incidental observation during the routine day's activities. It is possible also to make observations more systematic.

Systematically Recorded Observations. The method of direct observation has been used in many studies in school situations by way of a systematic scheme for noting and recording certain things over specified periods of time.¹ This method may be used to determine, for example, the extent to which pupils show originality or initiative, or exercise leadership, or are

able, without close supervision, to behave in a responsible and socially acceptable manner.

To use this method, it is usually necessary for a person to give it his undivided attention. For this reason, the methods may not be suitable for individual classroom teachers unless used in cooperation with other persons. While this restricts the extent to which the method can be used it does not detract from its value when it can be tried.

Many of the objectives that schools are seeking to achieve in the field of human relationships, various aspects of citizenship and the like, can best be evaluated by use of the method of direct observation. This method can provide not only the kind of information that is necessary to translate these objectives into terms of concrete, everyday acts, but they can also give an indication as to how well the objectives are being achieved by providing records of how the pupils are behaving and how their behavior has changed.

While the method is somewhat time-consuming it should be pointed out that if a given objective is regarded as an important feature of the school's program, provision should also be made to determine whether it is being achieved. If the method of direct observation can give the best answer, then the use of the method should be incorporated into the teaching plan.

Systematic methods of direct observation can be devised to study entire groups at a time, or to study individual children repeatedly for specified periods of time. The kind of behavior studied may range from something broadly defined, such as any sort of social contact or any sort of contribution in class, to something defined in terms of more specific items, such as (under the general heading of social contacts) sharing, smiling, hitting, snatching, and the like; and (under the heading of contributing in class) answering when called on, volunteering or offering facts or opinions, praising or criticizing other participants, and the like.

We do not have space here to go into the multitude of ways in which it is possible to adapt methods of direct observation to

specific school projects. An important step in applying the method is to try it out experimentally to find how best it might be adapted to a particular problem.

ANECDOTAL RECORDS

One of the most widely used adaptations of the method of direct observation is the taking of what has been known as "anecdotal records."²

This method involves a recording at the time or later of anecdotes or happenings—something a pupil does or says or a happening that involves him—that reveals (or might reveal, when many anecdotes are compiled) something about him that would be useful for the teacher to know or later to be reminded of. Such episodes might involve friendly or hostile contacts with other children, or a display of interest in a certain activity, or completion of an especially fine piece of work.

The procedure in taking anecdotal records is usually more flexible and can be fitted into the teacher's regular work more readily than the more systematic kinds of observation. Even so, it is important that the purpose for which anecdotal records are being taken is carefully thought out and that the procedure be tried out experimentally and re-examined periodically.

Use of Anecdotal Records as Aids to Recall and Sharpened Observation. Anecdotal records can serve many ends. The records guard against forgetting things that are important to recall. They can serve as a guard against faulty recall. They can be used as a safeguard against a tendency to remember only the favorable or unfavorable events in the case of pupils whom the teacher happens to like or dislike.

One other value of an anecdotal record is the value that can be derived from any form of writing. Whenever one has to put something into words he usually finds that he has to formulate it a little more carefully than when one simply makes a mental note of it. He may find that in the process of formulating it and finding the right words he has to think the whole matter over and so what he writes down after a little thought may be more sagacious than the offhand mental note he might have made.

Varying Purposes. The purposes underlying the keeping of anecdotal records may vary widely. The keeping of anecdotal records may be a part of the program of keeping a permanent cumulative record for each pupil that follows him from grade to grade. This may include an appraisal of the pupil by each of his teachers and a collection of accounts or anecdotes of happenings that illustrate or form the basis of these appraisals.

Anecdotal records may also be kept simply for the teacher's own use without any idea of making a permanent record. The teacher may be interested in following the progress of a certain child, noting how often and under what circumstances he volunteers to recite, or noting the occasions or the children who seem to arouse his interest or his anger. They may be used to get a more complete picture of the social structure of the classroom group with the loyalties and rivalries, feuds and friendships it contains, than could be gained by unrecorded recollections.

Value in connection with reports to parents. Anecdotal records may be very handy in connection with reports to parents.⁵ A teacher may record what he regards as typical or characteristic happenings in order to illustrate the points he brings up when he talks or reports to parents. Similarly, the teacher may wish concrete illustrations for a conference with other teachers or for a conference with the school psychologist, and the like. When a teacher is able to describe a concrete situation he not only can make his points clearer, but the fact that he can describe a pupil in such concrete terms is likely to help convince parents and others that he is genuinely interested in his pupils.

Value as a mirror of teacher's practices. The teacher may also take anecdotal records to serve as a record of his own activities and as a basis for evaluating some of his own practices. His record, for example, of having reprimanded a pupil on a certain day may, when read a couple of weeks later, after he has had more experience and better understanding of the pupil, remind him that he tends to judge his pupils a little too hastily. Or he may be reminded in other ways that he is perhaps incon-

or more persons whom they would like best to sit with, go on a picnic with, have as a teammate, study with, and so on.⁴

When pupils have made their choices, it is possible to note how the choices were distributed, who chose whom, who was most often chosen, who was not chosen at all, who chose a certain person without being chosen by that person, and so on.

If there are differences within the group by reason of the fact, say, that members of different religious groups, or children from poor or wealthy districts of the community hold themselves aloof from each other, the results are likely to show it.

Social acceptance and social distance. One adaptation of the sociometric technique is to ask each person in a group to give a reaction to each of the other members in the group (as distinguished from naming only one person or two or three). The Ohio Social Acceptance Scale, which is an example of this procedure, presents each person with a list of the names of all students (or of all boys or girls) in the class and directs him to give a verdict about each of the other persons in terms of a six-point scale. The first position in the scale represents strong liking or acceptance and the number "1" is entered for the names of persons whom the individual regards as his very best friends. At the other extreme, position six represents not acceptance but rejection, and the number "6" should be entered for persons whom the individual definitely dislikes. Positions two, three, four and five are intermediate between these extremes, with three representing a neutral attitude.⁴

A somewhat similar instrument for getting persons in a group to express themselves, favorably or unfavorably, with respect to other members of the group is the Horace Mann-Lincoln Institute Social Distance Scale. In this scale, also, the names of all members are arranged horizontally on top of a wide sheet and a space is given for the individual to check degree of preference or rejection on a scale ranging from one to five. Position one identifies persons whom the individual would like to have as one of his best friends and position five represents a desire definitely not to be in the company of this person.⁴

The "Sociogram." The findings obtained by means of a sociometric technique can be shown graphically in the form of what is known as a sociogram. An illustration of this is given in Fig. 23, which is based on a set of choices, as shown in Table XVII made by a group of sixth-grade children when reporting whom they would like to have as their best friends. In Fig. 23

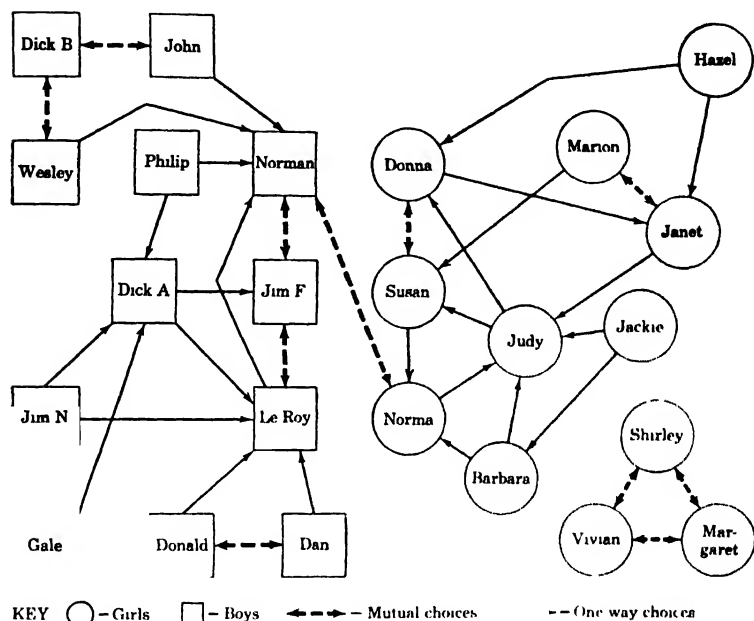


FIG. 23 GRAPH OF FINDINGS IN TABLE II

Sociogram based upon the first two of the three choices made by each sixth-grade pupil (From *How to Construct a Sociogram* by Ruth Cunningham and others, Horace Mann-Lincoln Institute of School Experimentation, Teachers College, Bureau of Publications, 1917)

it will be noted that except for two children, the girls limited their choices to girls and the boys limited theirs to boys. Note also that there is a little group of three girls who chose one another and who neither chose nor were chosen by anyone else. Among the remaining girls there is one who was chosen by four others and there are two who are not chosen. Persons who are

not chosen have been referred to as "isolates" by those who use this method.

TABLE XVII

CHOICES MADE BY EACH CHILD IN A GROUP OF TWENTY-FIVE SIXTH-GRADE PUPILS WHEN ASKED "WHOM WOULD YOU LIKE TO HAVE AS YOUR THREE BEST FRIENDS IN THIS GROUP?"*

<i>Person Choosing</i>		<i>Persons Chosen</i>	
Barbara	Judy	Norma	Jackie
Dan	Donald	LeRoy	Jim F
Dick A	Jim F	LeRoy	Jim N
Dick B	John	Wesley	Jim N
Donald	Dan	LeRoy	Jim F
Donna	Susan	Janet	Barbara
Gale	Jim N	Dick A	Norma
Hazel	Janet	Donna	Barbara
Jackie	Judy	Barbara	Norma
Janet	Marian	Judy	Barbara
Jim F	Norman	LeRoy	Wesley
Jim N	Dick A	LeRoy	Jim F
John	Dick B	Norman	Donna
Judy	Susan	Donna	Norma
LeRoy	Jim F	Norman	Dick A
Marian	Janet	Susan	Norma
Margaret	Shirley	Vivian	Janet
Norma	Judy	Norman	Janet
Norman	Jim F	Norma	LeRoy
Philip	Norman	Dick A	Jim F
Shirley	Vivian	Margaret	Janet
Susan	Norma	Donna	Janet
Vivian	Shirley	Margaret	Janet
Wesley	Dick B	Norman	Jim F

* From *How to Construct a Sociogram* by Ruth Cunningham and others, Horace Mann-Lincoln Institute of School Experimentation, Bureau of Publications, Teachers College, Columbia University, 1947 (mimeographed), 37 pp. Reproduced by permission. Note that Figure 23 utilizes only the first two of the three choices shown in this table.

Sociometric techniques have most frequently been used with a positive phrasing (e.g., "Whom do you like best?") as distinguished from negative phrasing (e.g., "Whom do you dislike most?"). Among objections to the latter form is the fact that some pupils do not like to record whom they dislike most. Also it seems that there are pupils who quite readily think of whom they like but have never especially given much thought

to the question of whom they dislike. There are circumstances, however, in which the kind of information which the negative form can reveal might be very important. We cannot always infer that the persons who are ignored when people name whom they like are the persons who would be singled out if their associates were asked to name whom they actively dislike.

Conditions disclosed by sociometric techniques. As we have noted, sociometric techniques may reveal many things about individuals or cliques within a group or about the group as a whole, that a teacher can take into account in his work with his pupils. The method can also be used to ascertain changes that have taken place within a group during a period of time. It may be used to find, for example, whether this or that isolated pupil now has won a certain amount of acceptance, whether there have been any changes with respect to earlier cleavages or divisions within the group, whether pupils who earlier named persons outside their class when listing whom they liked to associate with now name classmates. Again, the information which the procedure provides with regard to individual pupils may be used as a point of departure for further study to find out, for example, why a certain pupil is scorned by the rest.

Here it should be said that neither the sociometric or other methods described in this chapter should be looked upon as a means of finding all the answers. The sociometric technique may, as noted above, reveal certain facts and uncover a certain problem which then can be handled by means of other, supplementary techniques. In the example above, the teacher, in trying to learn more about an isolated child, probably would make a special effort to observe him. Perhaps he would keep anecdotal records for a time, he might use a personality test, or a device for studying interests, as additional means of finding out about this youngster and tracing changes as they occur.

"Guess Who" and Pupil Portrait Techniques. The "Guess Who" technique also provides a means of getting ratings or appraisals of pupils by one another. One way of constructing such a test is to provide a series of little word pictures of per-

sons with given characteristics. The person who takes the test is then asked to "guess" whom each picture refers to. The pupils are instructed to read each statement or word picture and to write for each one the names of any boys or girls who may fit it. If it fits no one they write nothing.⁵

The word pictures may include items such as:

Here is the class athlete. He (or she) can play baseball, basketball, play tennis, swim as well as any, and is a good sport.

Here is someone who is always willing to play or work with the rest even when he (or she) cannot have his own way.

This is a jolly good fellow, is friends with everyone no matter who they are.

Here is a crabber and a nagger. Nothing is right. Always kicking and complaining.

This one does not obey any rule if he can get out of it.

As many items as are practicable may be included. In one such test there were twenty-six little sketches.⁵

Another scheme is to ask for ratings in terms of degrees of frequency or intensity rather than on an either-or basis. These may range on a time scale from often to never. The scale may also range from the extreme in one direction (such as "Bossy: is always telling others what to do") to the opposite extreme ("Submissive: does not mind being told what to do, does not mind being bossed"). This illustration is from a scale used by Tryon.⁶

An adaptation of the "Guess Who" technique can be used also for getting pupils to give a picture of themselves. They might write in their own names in connection with items such as those listed above or a form can be devised for having each pupil check *S* if he is the same sort of person or *D* if he is different. A test called "Pupil Portraits" by Pintner and others is an example.⁷

Informal Evidences of Pupils' Opinions of Each Other. In connection with the life of the school, many situations occur which provide indications of what children think of each other. Class elections can provide some information of this sort, especially when elections are made to a variety of positions. Selec-

tions of committee members, delegates, and representatives for various purposes may also give pertinent information. The way in which children seek each other out and choose companions and leaders on the playground also provides important information.

A teacher who is trying to discover the special abilities and potentialities of each child will especially keep an eye on the way in which youngsters show to advantage or reveal ability or skill in various play and work situations other than those involving academic class work.

The way in which children group themselves when they are free to do so may provide a realistic enactment of the information that is elicited by the sociometric and "Guess Who" techniques. However, paper and pencil tests such as these may also reveal choices and feelings that are not carried into practice, for on paper a person may name someone whom he wishes as a companion, but has not won, or someone whom he dislikes even though he does not actively fight him or pointedly shun him in the practical school situation.

As we have noted, the "Guess Who" procedure and the outcomes of actual elections and the like, give an indication of how a pupil is thought of by his fellows. These indications tell something about the reputation a particular child has earned and indicates the extent to which he is regarded as having good traits or bad traits or isn't noticed at all. It should be observed that the way a pupil is judged by other pupils is important whether or not the teacher thinks the judgments are correct or fair to the pupil in question.

Ratings as a Form of Evaluation. When pupils rate one another they not only provide information which the teacher should know but they also can be used as a basis for evaluating the school program. A pupil who is regarded by his fellows as having many objectionable traits probably labors under many emotional difficulties. If many pupils are so regarded it might also mean that there is considerable amount of bad feeling in the group. Regardless of the basic cause of the difficulties, they offer a challenge to the teacher and to the school as a whole.

Here, as in connection with other findings, it is possible to bring various methods to bear in an effort to learn more about difficulties that exist, to find ways of dealing with them, and to gain information at later times as to the extent to which the steps taken to improve matters have been successful.

TESTS OF PERSONALITY AND OF EMOTIONAL ADJUSTMENT

A great many tests have been devised for gaining information concerning personality traits, emotional tendencies, emotional difficulties, and symptoms of maladjustment. Instruments of this sort have variously been called by names such as personality tests, personality inventories, character sketches, adjustment inventories, problem check lists, personality analysis, personal data blanks, and the like. Personality tests are discussed also in Chapter XXI. Buros ⁸ has given appraisals of a large number of instruments for measuring personality.

Types of Tests. Some instruments aim to determine certain general tendencies in personality, such as a general tendency to be a dominating or a submissive sort of person, or a tendency to be an introvert (looking inward, thinking carefully before acting, and the like) or the opposite. Such instruments might include questions as to whether the person feels uneasy about speaking in public or taking a front seat, or whether he likes to plan and think alone in preference to planning or thinking things out with others.

There are instruments also that raise questions concerning a number of specific emotional tendencies, such as fear, hostility, loneliness, or feelings that one is being persecuted or unfairly treated and the like. In one of the earliest forms there were questions as to whether the person felt uneasy about crossing a bridge, whether he stuttered, whether he felt nobody loved him, whether he felt rather tired a great deal of the time, whether he had a strong desire to set fire to something or to steal something.⁹

Among the tests that have been widely used at the high school and college levels are the Bernreuter Personality Inven-

tory⁹ and the Bell Adjustment Inventory.⁹ These are described in more detail in Chapter XXI.

Among the more widely used tests for younger pupils are the California Test of Personality, Elementary Series⁹ and the Rogers Test of Personality Adjustment (separate forms for boys and girls).⁹ The Pupil Portrait technique, earlier described⁹ and an earlier form called Character Sketches⁹ also can be used with children in the upper elementary and junior high school grades.

Apart from tests that cover a wide range of feelings or emotional conditions, forms can be devised to deal, in some detail, with a limited subject, such as what a person worries about,¹⁰ or what especially annoys him, or what have been his main sources of happiness.¹¹

How Authentic Are the Answers? Tests of this sort have been used with varying degrees of success, and psychologists have differing opinions as to their value. Limitation of such tests in connection with individual guidance are discussed in Chapter XXI. One problem, of course, is that a person who is moderately "test wise" may try to give what he thinks is a good or proper or respectable answer rather than the answer that most frankly describes him as he is. Moreover, within a certain group, the persons who take the test may differ in the extent to which they are candid and conscientious in their answers. In other words, there is not only a possibility that the answers of a certain individual might not be genuine, but also the possibility that the answers of different people may vary in degree of genuineness. For this reason it might be quite erroneous to look upon Jimmy as more maladjusted than Johnny simply because Jimmy on a test reported that he has twenty problems or symptoms of emotional difficulty while Johnny checked only five or ten.

Values Even When Test Scores, as Such, Are Unreliable. However, even if a pupil's score on a certain personality test is questionable, the test can still be of value in studying individual pupils when used in conjunction with other sources of information.

What a person sees fit to admit or deny about himself may be revealing whether or not he actually is telling the truth. If, for example, a person marks himself as being a very happy sort of person when there is every reason, on the basis of other evidence, to believe that he is not, or if he marks himself as an even-tempered person when actually he is quite quick-tempered, it appears that he is either unaware of his condition or is unwilling, or ashamed, or afraid to admit it.

On the other side, he may reveal difficulties or weaknesses or feelings about himself which his teacher had not suspected. Again, individual children as well as entire groups may give some particular responses that are revealing, or that give a clue to other things. If, for example, many children in a group show what seems to be an uncommon tendency to be anxious and afraid it probably would be wise for the teacher to view this not only as a problem in the personal lives of these children, but also as a problem that might have been brought about in part by something in the life of the school.

Here again, once a problem has been uncovered, the way is open not only for seeing what can be done about it but also for making an appraisal, as time passes, of the extent to which the problem still prevails or has been overcome. For this appraisal it might be useful to administer a certain test again or another form which gets at similar information in a somewhat different way. The information needed for appraising what has happened might also be gained from talking to the pupils, or by observing how they behave.

RATING SCALES FOR USE BY TEACHERS

Several procedures have been devised for securing ratings of pupils by their teachers or by other adults who know them. A form is provided which enables the rater to give his judgment of the pupil in terms of a definite list of traits or characteristics. Some illustrations follow.

The Winnetka Scale for Rating School Behavior and Attitudes¹² consists of descriptions of everyday classroom activities in four areas: cooperation, social consciousness, emotional ad-

justment, leadership and responsibility. Under each are a series of statements such as:

When taking turns with apparatus or materials in a group discussion

Waits for a turn.

Takes turn willingly.

Needs occasional reminder to be patient.

Is too patient—does not assert himself.

Is impatient while waiting turn.

Is unwilling to wait turn.

Is unwilling to wait turn and interferes with other children's activities.

Two other lists like the above are provided. The scale is suggested for use over a three-year period with two ratings each year in order to measure development. A scheme is provided whereby a total score is secured from the items checked in each list. As a basis of comparison, the authors provide a table showing the median scores obtained from children previously tested in each of the five areas of behavior.

The Haggerty-Olson-Wickman Behavior Rating Scale enables teachers to note systematically whether and to what extent pupils have certain types of "behavior problems" and to mark the pupil with respect to an additional list of characteristics.¹³

The schedule consists of two parts. The first part includes brief descriptions of fifteen "behavior problems," such as cheating, unnecessary tardiness, overactivity, and temper outbursts. The teacher reports for each child that the described behavior has never occurred; has occurred once or twice but no more; has occurred occasionally; or has occurred frequently. The second part consists of thirty-five graphic rating scales for various types of behavior traits. See the example below:

3. Is his attention sustained?

Distracted: jumps rapidly from one thing to another	Difficult to keep at a task until completed	Attends adequately	Is absorbed in what he does	Able to hold attention for long periods

Further examples from the behavior rating scale:

12. Is he easily fatigued?

Shows quick exhaustion	Does not have ordinary endurance	Endures satisfactorily	Rarely shows fatigue	Unusually vigorous and robust
------------------------	----------------------------------	------------------------	----------------------	-------------------------------

24. What tendency has he to criticize others?

Never criticizes	Rarely criticizes	Comments on outstanding weaknesses or faults	Has a critical attitude	Extremely critical. Rarely approves
------------------	-------------------	--	-------------------------	--

The soundness of a rating will depend upon a number of factors, including the extent to which the behavior or characteristic in question is clearly described and whether its appearance, when it occurs, can be clearly perceived. The soundness of the ratings will depend also upon the competence and conscientiousness of the rater and the extent to which he is able to judge any one aspect of a pupil's behavior without being biased by information he already possesses or attitudes he already has formed. Here it may be noted, as one might expect, that there is likely to be less agreement between the ratings made of the same pupils by two different judges than between the ratings given by the same judge who rates the group on one occasion and then after an interval rates the group again.¹⁴

One advantage of rating schemes such as these is that they can provide an appraisal of many traits and qualities that could be measured by other methods only with difficulty or with a more considerable expenditure of time. Sometimes such ratings, along with other devices, are used to obtain a comprehensive picture of the morale of a classroom or of an entire school.

CONVERSATIONS AND INTERVIEWS

By using a certain amount of finesse and by cultivating the art of being a good listener, a teacher can add greatly to the quantity and quality of information that can be obtained simply by listening to what pupils have to say. We will not here take space to go into all that is involved in establishing rapport and in getting the most out of an informal conversation or

formal interview. There are, however, a few elementary points that should be made.¹⁵

In interviewing, as in the use of any other technique, the attitude of the person who is seeking information is important. If he is obviously shocked or bored, or disapproving, the person who is interviewed may keep still, or calculate what to say rather than speak freely. Moreover, the phrasing of questions, the sequence of questions, the tempo of the inquiry, the use of little comments, or elaboration, or digressions now and then may have an important effect.

It is essential not to put the person who is questioned on the defensive. For this reason, interviewing for the sake of finding out information that might have a constructive use should never be used as a form of discipline. For this reason, also, there are some kinds of information that can only be elicited by a person who is not in a position of authority or in a position to reward or punish—another reason, among several, for the value of a cooperative approach to the study of children.

The fact that a great deal of skill is involved in conducting a good interview emphasizes the fact that it takes practice and time to learn interviewing techniques just as it takes practice to make the best use of any of the procedures described in this chapter. It emphasizes also the value of a policy of getting as familiar as possible with what others have learned and have reported.

PROJECTIVE TECHNIQUES

A person often reveals something about himself without putting his thoughts or feelings into so many words or without directly showing his hand. We can sometimes learn a great deal about a person through the kind of remarks he makes about other persons. We can sometimes infer something about him from the role he takes in games, the kind of literature he prefers, the kinds of pictures he draws.

The label "projective techniques" has been applied to settings or materials designed to give a person a chance to reveal his thoughts and feelings while seemingly responding to some-

thing in the external environment.¹⁶ A child is watched, for example, when he is playing with dolls representing a father, a mother, a boy, and a girl, and with household furnishings. He has an opportunity to project his thoughts and feelings into the play activity. If he is a boy who happens to be jealous of his sister, he might, for example, put the father or mother doll through the motions of spanking the girl doll, and then seat the father and mother with himself between them, while the girl is shunted to a far corner of the room. Again, he might be told the beginning of a story which tells about a father and mother and their son and daughter going to a picnic on the banks of a river, and which goes on to narrate that while the parents were preparing the food the two children go off to play and then all of a sudden someone screams. . . . At this point the person who is being studied may be asked to complete the story.

An account of certain projective methods follows. Each description is meant to illustrate rather than to prescribe in precise terms how the method in question might be used. These techniques have great promise and have yielded very significant information about human behavior. In order to obtain information that can be used with confidence it is necessary to study each method quite carefully and to have a considerable amount of experience in using it. When taken on these terms the methods can provide important information concerning the ideas, attitudes, and adjustments of pupils and concerning ways in which their conceptions and attitudes change. Moreover, even if used in a more casual or informal manner, the methods can yield useful information. This is all the more true by virtue of the fact that many of the materials and situations connected with the day-to-day life of the school give pupils an opportunity to project their thoughts and feelings.

The Rorschach test, which has been used widely and effectively for clinical and research purposes and in connection with intensive case studies of individual students, is described in Chapter XXI.

Play Situations. The doll family mentioned above is an example of a play situation.

It is possible to use many different kinds of play situations and many different materials, including old and young people; people of different races; representations of cheap or expensive, sturdy or fragile, equipment: animals; dough, paste, and the like; representations of free or forbidden things ("Keep off the grass," for example), representations of things that might elicit rivalry or an impulse to steal; representations of being blocked or in danger, and the like. The idea in each case would be to present the person with something by means of which he might act out or reveal his thoughts, impulses, and feelings about himself, his tendency to be spontaneous or inhibited, to show guilt or embarrassment when an impulse is aroused, his idea of the fitness of things, his tendency to conform, his impulse to show disrespect for property or people or rules.¹⁷

In real life children often, of course, develop play situations in which they act out their ideas. Here, as in the prefabricated play situations, they will sometimes show their conceptions of what is "good" and "bad," mete out punishment to various persons, and distribute praise and blame.

The problem of interpretation. One of the problems in using a play situation as a means of studying children is the problem of discovering just what certain activity means. In depicting a home scene, for example, a youngster may have the mother spank all the children. Without further information we cannot tell whether the youngster is imitating her mother, giving vent to her own feelings, or acting out something else. The answer may, however, emerge as there is opportunity to observe the child a number of times or to see a given bit of behavior in a number of different contexts.

Controlled play situations. A play situation may be used in a more direct manner for eliciting information about people. One may take a hand and actually put the play characters through certain motions as, for example, causing one of them to hit another or take something he should not, and then ask the child what he thinks about this act, or what should be done with the person who does such things.

Play situations may also be used as a means of helping chil-

dren to get a better understanding of their own problems and as a means of finding whether they have gained in understanding. They can also be used as a means of direct teaching, such as in the teaching of safety rules, or the teaching of manners and techniques that would help children to avoid quarrels.¹⁸

Story Telling and Story Completion. The theme a person chooses when asked to write a story, and the adventures and escapades he describes, may indirectly reveal something about his feelings and desires. He may be asked to let his imagination go, to show how imaginative he is. It is possible, also, as suggested above, by means of an unfinished story, to control to a degree the imaginary situation in order to discover how a person will respond to a certain situation or problem. In one study, for example, the attitudes of delinquent and nondelinquent children toward their parents were appraised by means of unfinished stories that gave the children the alternative of ending the story in a manner that would be favorable to their parents or favorable to someone other than their parents.¹⁹

Interpretation of Pictures. Something akin to the storytelling technique is offered by presenting persons who are being studied with pictures and having them interpret the pictures or build a story upon the scenes that are portrayed. The Murray Thematic Apperception Tests involve a systematic use of pictures²⁰ representing a number of dramatic events.

In the use of pictures as in connection with the use of stories, a person can be left quite free in his own way to elaborate, to tell what the picture makes him think of, or he might be asked specific questions. In order to study, say, a child's notion about what it means to be rich or poor, youngsters might, for example, be shown pictures of children who are clean and others of children who are dirty, or of children who are in the act of doing something "good" or "bad." They might then be asked to indicate which of these children are rich and which are poor.²¹ In order to study what kinds of predicaments children are sensitive to, we might portray persons in situations that are meant to be frightening, or painful, or humiliating.

In interpreting pictures as well as in completing stories, it may be important to note not simply the turn of thought the child injects into the situation, but also to note his mood, whether he tends to take a rather sad view of things or tends to see signs of danger where others don't, or to look for signs of hostility or unfairness in others.

Original Drawings and Paintings. The theme or subject one chooses to draw may occasionally be revealing. Again, it is possible that there is significance in the colors one chooses, the masses and open spaces that the painting contains, the length, direction, curvature of the lines, and the like. A detailed account of young children's paintings and how they might be interpreted has been published by Alschuler and Hattwick.²² The two-volume work by these authors gives copious illustrations and supporting documents. Finger painting has also been widely used as a means of giving children an opportunity to reveal their feelings.²³

Owing to problems of interpretation it perhaps would be wiser for teachers to recognize that drawings and paintings may tell something about the personality of the child, and may occasionally draw rather sharp attention to something that at the moment is troubling the child or making him feel happy, than to try to make systematic evaluation of their pupils by way of their drawings and paintings.

Role Playing, Dramatics, and Puppetry. Somewhat akin to the story telling and play situations are the techniques of having pupils act out roles, or act out or write dramatic themes, or depict an action or circumstance through pantomime or puppet play. The pupil may reveal something about himself by the role he chooses, by the conception he has of this role as shown by the way he enacts it, and through the conceptions or the feelings he entertains with regard to other roles or characters as revealed by the way in which he rejects them or treats them when he plays his own parts.

Other Techniques. There are many other techniques which get a person to reveal something about himself. One of the most direct procedures is to find out what a person's daydreams

and dreams are. What the person tells may directly reveal something of the emotional tone of his daydreams and dreams, and indirectly reveal something about his desires or his fears or his prevailing mood. As we noted in an earlier chapter, daydreams and even more especially dreams are rather difficult even for an expert to interpret, but the fact still is that they do not just happen. In one way or another, they have their roots in the person's private world.

Another procedure which may indirectly tell us something about a person is an adaptation of "free association" or "word association" techniques. A person may be asked, for example, to speak aloud all the words he thinks of when given the word "father" or "school" or "unhappy" or the like. The associations that come to mind and the feeling tones that occur in his responses may reveal something about what is on his mind.

APPROACHES TO THE STUDY OF ATTITUDES

Many of the methods described under other headings in this chapter throw light on children's attitudes.²⁴

Attitudes Towards Various Religious, Ethnic, or Socio-economic Groups. In some schools it is important from the point of view of practical management to discover emotional currents in the relationships of the youngsters to each other, as determined, say, by prejudices or barriers between children representing different religious or socioeconomic groups. On a more academic level, it is important in connection with some forms of teaching, such as instruction in citizenship and world affairs, to discover what the pupils' attitudes are with regard to different peoples and conditions in the world at large.

Such attitudes can sometimes be studied indirectly. The sociometric technique, as described above, will sometimes throw light on attitudes of members of a group toward each other.

Attitudes can also be studied more directly by means of forms which list, for example, different national or religious groups, or name people from different occupations or walks of life, or list various forms of political affiliation (*e.g.*, Repub-

lican, Democratic, Communist), and give children an opportunity to register their likes or dislikes, or to rank the items on the list in order of preference.

It might prove valuable to follow such a procedure with further study to see what sort of ideas or conceptions the pupils have about groups whom they like or dislike. It might be found, for example, that if pupils express dislike for certain people, their reasons may range all the way from real or imagined resentments to acceptance of certain stereotypes that have been handed on to them.

Attitudes Toward School. There are times when it is useful for a teacher to have information concerning pupils' attitudes toward school or any part of the school program, or toward their teacher. Answers to questions concerning children's interests, likes and dislikes, as discussed elsewhere in this chapter, may provide information of this sort. It is possible also to solicit the information more directly by asking pupils, say, to respond to a more detailed list of questions concerning what they like or dislike about various features of the school program, the rules and regulations, the teachers they have had, and so on. It might help to avoid embarrassment by asking the pupils to rank specified features of the school program in order of preference without in so many words expressing a dislike of the things that they place at the bottom of the list. If questions are asked concerning attitudes toward teachers it would be well, of course, to be sure that all members of the teaching staff are made aware of this and are agreeable to the idea.

Moral Concepts, Values, Heroes, Ideals. Information concerning the pupil's values, moral concepts, and ideals may be valuable both for general educational purposes as well as for the sake of better understanding of the pupils as persons.

A form prepared by Allport and Vernon²⁶ which can be used with older students provides a test of values by enabling a person to make a choice of alternative answers to a number of questions or issues pertaining to moral, scholarly, aesthetic, political, vocational, and other matters.

There are various tests or more or less formalized pro-

cedures that have been used for this purpose.²⁵ However, it is possible also to improvise rather simple techniques.

One such technique might consist simply of asking children to name (in interviews or in writing) the person whom they would choose as their hero or ideal (*e.g.*, "Of all the people you know or have ever heard about, whom do you admire most?" Or: "Whom would you like most to be like?" Or: "Whom would you choose as your favorite hero?"). Such a procedure might reveal certain trends within the group, such as a tendency on the part of children of varying age, socioeconomic background, or intelligence level to differ in the extent to which they choose acquaintances, characters from the comics, historical figures, and the like, or occasional rare but revealing choices by individual children, such as the choice of a well-known criminal as an ideal.

Indirect Study of Attitudes. To evaluate a project or a feature of the school program that was designed to have an influence on the attitudes of pupils, such as increased appreciation of art, or increased willingness to discuss controversial issues, or an increased tolerance for certain peoples, it may be better to approach the study of attitudes indirectly than in a manner so obvious that pupils can pretty well guess what the right or hoped-for answer should be. For example, instead of asking the child concretely how much he likes or dislikes this particular thing, he might be asked in more general terms what he likes to do or to study.

A compromise between a very general approach and an approach which pointedly calls the pupil's attention to one specific thing may be achieved by having the pupil react to this item along with a number of others. For example, in a situation in which there has been bad feeling between pupils and an effort has been made to promote better relations, items such as "people who fight," "people who hit," "people who chase you," might be scattered through a list of other unpleasant things; the pupils could be asked to rank the items in degree of unpleasantness, or in terms of how frequently they encounter this unpleasantness, or they could give some other measure of

the frequency or seriousness (such as "often," "sometimes," "never," "bothers me very much," "just a little," "not at all"). If there has been a change for the better in the children's social relationships one might expect that this would be shown by comparing the emphasis given to unpleasant traits in people after the program has been put into effect with the responses made before the program got under way.

In some situations it may be quite important for a teacher to gain more than casual information about his pupils' moral and ethical judgments. This is likely to hold true if, for example, a teacher of so-called "middle class" background is working with children whose cultural and economic circumstances differ from his own and who, on this account, may be difficult to understand. One procedure might consist of having the pupils briefly (and individually) tell what should be done about a person who misbehaves in various ways (such as whispering in class, disobeying his parents, using "bad words").

APPROACHES TO THE STUDY OF CHILDREN'S INTERESTS, WISHES, LIKES, AND DISLIKES

Methods of getting information about pupils' likes, attitudes, and interests range from the use of rather simple general questions such as "What do you like best about school?" "What do you do during week ends?" to procedures which raise a number of specific questions or list a number of specific items which the pupil can check. In marking a check list, the pupil may be asked to indicate frequency (*e.g.*, "often," "sometimes," "never") or intensity of feeling (such as "*like it very much*," "*don't care*," "*dislike it very much*"). Other responses also are possible, including simply a yes or a no.

For some purposes it is important to leave the child completely free to respond in his own way, and if such is the case it is better to use a general question such as "What do you like best?" rather than to give him a list of reminders that he might check. On the other hand, the reminders which a check list provides give a broader and more detailed survey.²⁷

A few illustrations of approaches to children's desires, interests and attitudes follow.

Wishes. Oftentimes a person reveals a good deal about himself—his aspirations and values—when he voices his wishes. One way of ascertaining wishes is simply to ask him what he would wish if he had three wishes. A “wishing well” technique has also been used.²⁸ Sometimes a wish expressed by an individual throws light upon some longing or a desire which the teacher had not suspected. Often the wishes of pupils express commonplace desires but these, too, may be quite informative, especially when the teacher is in a position to compare the wishes of pupils with older or younger pupils or with pupils of a different intellectual or economic level. Children's wishes may also give a commentary on the school as, for example, when a number of children wish that school were out.

Interests, Likes, Dislikes. Interests of pupils may be studied by simple questions as to what they like to do or how they spend their spare time and by more detailed check-lists or questionnaires. The direct questions also could cover items such as what the pupils would like to learn more about, or don't care to study about. It would be possible, furthermore, by detailed lists of questions, to explore what subjects the pupils like best; what aspects of the school program they prefer; what books they read; what radio programs they listen to; and the like. In one interesting check list (the Ohio State Interest Inventory)²⁹ for intermediate grades there are 360 items, each of which may be marked with an L (Like) or a D (Dislike). Items representing different categories such as sports, music, chores, food and drink, are intermingled.

Among other techniques that can be used to obtain an individual indication of interests and dislikes are the use of a question box into which pupils may drop notes about things that interest or perplex them, and a complaint box.

Findings on these points may reveal some things directly and other things by implication. What children fail to mention when they discuss what they like best, for example, may be significant by its omission. Again, the turn of thought that occurs

to children when questions such as these are raised may reveal something quite significant. In one study it was found that children in different communities differed to a decided degree in the extent to which it occurred to the children to mention people when they were asked, in general terms, to describe *what* they disliked most. Even though the question asked *what* (not *whom*) a surprising number of children in some communities mentioned people.

Methods of Handling the Replies. In using procedures such as the foregoing, it will usually be necessary, as with many other procedures, to develop a scheme for analyzing or classifying the answers. This is especially true when questions are general and children are completely free to name anything that occurs to them. It is wise to let such a scheme grow out of the reports themselves. It may be clear after a number of responses have been examined that there will be one general category, say, of play activities, another which includes forms of entertainment such as the movies, another which includes certain kinds of intellectual or artistic enjoyment, such as reading books or painting pictures. These broad categories may, in turn, be divided into smaller subcategories, which make a distinction, for instance, between active or sedentary play, play of a social or solitary sort, various skills involved in play, and the like. The categories may be general or highly refined, or they may single out certain types of answers for special consideration, depending on the purpose of the inquiry.

Leads to Further Information. The responses pupils give when asked about their likes and interests may show the way to other kinds of information. When a pupil is asked, say, to tell more about an interest he has reported, or to reveal more about why he answered as he did, he may thus throw new light on his motives and problems. Replies may also supply a starting point for an inquiry by the teacher or the group as a whole into certain aspects of the life at school or some aspect of the teaching program which has been praised or criticized by several pupils. If, for example, several pupils should mention that they do not like music or the social studies or any other feature

of the program, this statement could provide the starting point for inquiry as to why they singled out these particular activities.

Incidentally, this research is one of the rewarding features of any kind of direct study of pupils. Anything that is found is likely to be interesting to any teacher who has any curiosity at all about people and things, and, besides, whatever is found usually raises questions for further study.

SUMMARY

The information gained by using various methods of studying the personal characteristics of pupils is useful both in determining what should be taught and in evaluating what has been taught.

The attitude of the teacher has an important bearing on the success he will have in getting information about his pupils, whether it be for the purpose of discovering their potentialities and needs or for the purpose of appraising what they have learned or gained during their experiences at school. In order to gain understanding of any pupil, it is important that one should be in a mood to find out rather than to judge, to discover what a certain trait or bit of behavior means to the person in question rather than forthwith to blame or belittle or praise.

To learn about others also means that one must be on guard against one's own bias and preconceptions. Understanding of others requires self-understanding.

A program which involves the use of various methods for studying pupils as persons also requires that the purposes for the use of each method should be fairly clearly thought out. Usually it will be well to proceed gradually, to try this or that procedure in a preliminary fashion, and then to let the scope and reach of the inquiry develop as the findings begin to emerge.

To apply methods of studying children it is important also to use the cooperative approach, inviting the cooperation of pupils, other teachers, and parents.

One of the most commonly used methods of study is direct observation. The method of direct observation can be applied systematically over specified periods of time but only if time is freed for that purpose. More often, in the average classroom, the method of observation will have to be employed by way of the taking of anecdotal records. Such records are useful as an aid against forgetting; they supply concrete illustrative material for conferences with parents; the process of putting something that has been observed into words may have the effect of producing a critical examination of mental notes that have been made more or less thoughtlessly. Anecdotal records can also be very helpful in supplying evidence that may lead to new discoveries, and also can be used in a "before-during-after" manner to show the progress a pupil has made in overcoming a problem or in learning a new skill.

Various ratings and evaluations can be obtained from pupils by means of sociometric techniques, "Guess Who" techniques, and other forms of appraisal, such as occur when pupils elect class officers or choose members of committees or teams.

Tests of personality and emotional adjustment can also be put to good use. Even if the quantitative scores which such tests yield may be open to question, the particular answers pupils give when they have a chance to reveal or to try to conceal tendencies within themselves and a chance to disclose problems which the teacher may not have suspected, can be very constructive when used in conjunction with other information that a teacher has concerning pupils. Moreover, there also are circumstances in which such tests can be used, first, to disclose tendencies within the group—such as a tendency to worry about examinations or to worry about being hurt by rough children and, second, to give an indication as to whether measures that have been taken to overcome such problems have succeeded.

Conversations and interviews provide a very valuable source of information about pupils. To use this method it is well to develop the art of being a good listener and, in order to interview effectively, it is also important to know as far as possible

in advance, and to learn as rapidly as possible in the process, what is the range of information and the kinds of information that the interview might elicit.

Projective techniques, which provide an opportunity for a person to reveal something with regard to his thoughts and feelings while apparently responding to an objective situation, such as taking part in a game, or completing an unfinished story, may also in the proper circumstances be used to good effect. Many projective methods can be used in a somewhat unsystematic manner by eliciting information now and then by way of children's drawings and paintings, stories, play activities, dramatic activities, role playing, and the like. If projective methods are used in a systematic manner it is necessary for the teacher to have had substantial experience and training in their use before the findings can be treated with any degree of confidence.

The attitudes of pupils toward persons, social or religious groups, moral values, school and teachers, can be explored and studied by way of direct questions as well as scales which have been constructed for the purpose and which allow the pupil to express a liking or disliking, acceptance or rejection, or degrees of preference for one thing as compared with others.

For the purpose of evaluating a certain project or feature of the school program, it may be wise to study children's attitudes indirectly so that they are not so likely to try to give the answer they think they should give.

Children's interests may be revealed both by what they directly report and also, on the negative side, by what they ignore or say nothing about. Since the things children like are influenced so much by what they have an opportunity to learn to like, a check list of activities that children are more or less expected to be interested in may fail to disclose interests that they might acquire if given the chance, or interests that they have acquired in a particular school situation. There are many interests which children may have acquired in a certain school situation which can be discovered only if the method that is

used to ascertain their interests is especially designed to cover this situation along with other things.

QUESTIONS AND EXERCISES

Exercises in connection with this chapter might profitably take the form of trying out some of the methods here described, if it is feasible to do so.

1. If children in various grade levels are available, several students might cooperate in getting information (orally from the younger, in writing from those above the third grade), in response to items such as:

My three wishes

What I like best at school

What I dislike most at school (or like least)

What I like best outside of school (not at school)

What I dislike most outside of school

Answers could be examined from the point of view of the kinds of ideas that occur to pupils and from the point of view of differences as related to age, sex, or widely different intellectual or socioeconomic levels.

2. Other possibilities would be to try out other techniques, such as interviewing students at various grade levels concerning issues that are current in the news, or having them report interests in games or radio programs or the like, or having them respond to pictures or unfinished stories designed to ascertain their attitudes with regard to certain peoples, such as different nationalities, or various activities, such as military drill.
3. Methods of direct observation might be tried out. Perhaps some one might keep a record of class discussion, noting who talks, how much, how ideas emerge or are enlarged or are pushed around. Note, among other matters, the practical problems that arise in getting, say, a verbatim report as distinguished from just a notation that a certain person spoke, and ways in which the records may have to be restricted in order to observe certain things in a systematic manner.
4. A personality test might be administered, followed by discussion of how enlightening pupils' responses to such a test might be to a classroom teacher.

CHAPTER XVIII



THE ADJUSTMENT OF THE INDIVIDUAL

Previous chapters have afforded a great deal of material bearing on the adjustment of the individual. The discussion of intelligence yielded insight into its values and limitations in the adjustment process.¹ All the chapters on the development of behavior, especially those on the development of social and emotional behavior, emphasized important points fundamental to an understanding of the present and immediately following chapters. The chapters on learning revealed essential clues to the process by which adjustive behavior is learned.

In the present chapter we shall take up the concepts of adjustment, needs, and goals. We shall consider the types of situations in which needs are thwarted, and in the next chapter discuss the methods used by both children and adults in dealing with such situations. In Chapter XX, we shall deal specifically with the conditions in the home, school, and, to a lesser extent, in the community, which tend to interfere with the adequate personality development of the child. In Chapter XXI we shall devote considerable space to a discussion of how to develop an understanding of the individual child and how to help him. Finally, Chapter XXII will deal with the problems and satisfactions associated with the teacher's status as an adult and as a member of the teaching profession. Our aim is to describe the underlying forces which bring about efforts at adjustment on the part of the child and to indicate the teacher's role in increasing the child's, as well as his own, efficiency and happiness.

GENERAL NATURE OF ADJUSTMENT AND MALADJUSTMENT

The term "adjustment" has two meanings. In one sense it is a continual *process* by which a person varies his behavior to

produce a more harmonious relationship between himself and his environment. The direction of his effort may be toward modifying his own behavior and attitudes or toward changing the environment or both. Others may contribute toward this adjustment process either by helping to change the environment or by helping to change the person's outlook on his environment. In another sense adjustment is a *state*, *i.e.*, the condition of harmony arrived at by a person whom we call "well-adjusted." Descriptively this person is relatively efficient and happy in an environment which we judge to be reasonably satisfactory.

Adjustment as Dependent on the Person. The degree of harmony may depend upon certain potentialities within the person. There is some evidence that hereditary factors of obscure character predispose certain persons to a mental breakdown under adverse environmental conditions which do not cause a breakdown in others.² This means that certain persons are *likely* to become maladjusted under conditions of stress although they are not *fated* to do so. It is not always possible to tell in advance which persons have a tendency to become maladjusted and which ones will weather severe conditions without developing a mental disorder.

It is true, of course, that certain persons with a definite handicap will have difficulty in adjusting to the conditions of ordinary normal living. Persons such as the blind, the deaf, and certain types of feeble-minded are recognized by society to require a special kind of environment or a modification of their surroundings in order to permit adjustment. It is only when they can not adapt under these conditions that they are considered to be maladjusted.

Adjustment as Dependent on the Environment. The degree of harmony also depends in part upon certain characteristics of the environment. The environment must be such that it is *possible* for a person to satisfy his basic organic and to some measure his personality needs, else he is perforce maladjusted, *i.e.*, inefficient and unhappy. What these needs are will be discussed in the succeeding section, and a more extended treat-

ment of environmental factors will be given in Chapter XXII. Here, however, it is pertinent to point out only that when maladjustment exists the causes are not necessarily found only in the person; they may be only in the environment, or in both. In some cases maladjustment arises only from the interaction between the person and his environment. For example, a man accustomed to living in a metropolitan center is transferred by his company to a small town far from a city of any size. Although he has been efficient and happy, he and his wife are unable to find congenial companions in the town and become quite unhappy. He is maladjusted to his (social) environment. But it is difficult to say that either he or the environment is at fault; it is merely that his environmental demands differ from those of his neighbors, and his inability to adopt theirs is matched by their inability to adopt his.

Social Adaptation versus Social Adjustment. Furthermore, the changes essential to effect an adjustment need not necessarily take place in the individual. The commonly accepted definition of social adjustment is "the changes in habitual conduct or behavior which an individual must make in order to fit into the community in which he lives."³ Although this is an acceptable definition of social *adaptation*, it can not be accepted as a definition of social adjustment because it implies that regardless of the extent to which the community fails to meet basic needs, the onus is on the person to make the necessary modifications in himself. Obviously one should not expect an individual to modify his behavior so that he may fit into a slum community which has a high crime rate and many centers of vice.

The Maladjusted Person. From the preceding discussion it is clear that maladjustment (as a state) refers to a disharmony *between* the person and his environment. How then can a person be said to be maladjusted, that is, referred to as a *maladjusted person*? Often when such reference is made in books or articles, the environment is simply ignored, and the maladjustment is attributed entirely to the person himself.

There are instances, however, in which it is legitimate to

speak of maladjusted persons. When the personality distortion has come about through previous interaction with an unsatisfactory environment, although the present environment is satisfactory, it is proper to use the terms. For example a child brought up in a home and community in which his needs for security were not met might have at maturity a personality so "twisted" and rigid that he could adapt to few (if any) environments. Such an individual would then be called a maladjusted person. The same would be true of one whose maladjustment resulted from a combination of hereditary and early environmental factors.

Adjustment and Social Feeling. Now let us return to our point of main emphasis that a well-adjusted person is one who is efficient and happy in a reasonably satisfactory environment. If efficiency and happiness were the only criteria, a school principal who terrorized his teachers and pupils, for example, might be considered well adjusted because he was efficient and happy. It seems necessary to add a "proper degree of social feeling" ⁴ to our concept of adjustment. Not only must a person be in an environment which enables him to satisfy his basic needs satisfactorily, and be able to manage his life so that the satisfaction of one need does not make the satisfaction of another impossible, but also he must satisfy his needs in such a way as to avoid interfering with the fulfillment of the legitimate needs of others. In short, the well-adjusted person is one whose needs and satisfactions in life are integrated with a sense of social feeling and an acceptance of social responsibility.

THE NEEDS AND GOALS OF THE INDIVIDUAL ⁵

A *need* exists as a state of tension ⁶ in a person which serves to direct his behavior toward certain goals. In Chapter IX this goal-directed behavior was attributed to *motives* or *goal set*. Here the word "need" is chosen to emphasize its primary importance to the person. It is used as an inclusive term to embrace drives, impulses, goal sets, urges, motives, cravings, desires, wants, and wishes. The choice of term is arbitrary, of course, because in the present state of knowledge it is impossi-

ble to disentangle the aspects which these concepts have in common and the differences between them.⁷ A *need*, then, exists as a state of tension which leads a person toward activities which will relieve the tension.

An activity or state which to some extent satisfies an individual's need or needs is called a *goal*. To illustrate, let us suppose a hungry child sees an apple near-by. The activity of eating the apple is the child's goal; the apple itself is the *goal-object*. It might seem preferable, as well as simpler in this instance, to call the apple the goal, but this practice would be inappropriate in other situations in which there is a goal but no goal-object. An adolescent, for example, may wish and strive to be popular; in this case, no goal-object exists. The adolescent's goal is the *state* of feeling popular.

Organic Needs. All needs may be divided into two groups—the organic needs and the personality needs. Each of these groups could be further divided with respect to their importance for survival or for adjustment. The basic organic needs are rather generally held to include the needs for air, food, liquid, proper temperature, rest and sleep. Needs such as these obviously must be met or the organism will die. The needs for sexual satisfaction and for activity are probably as universal as the needs already mentioned, but they are less vital since deprivation would not cause death. There are countless organic needs of lesser importance. Among them are the need for certain kinds of sensory gratification, *e.g.*, sweet tastes; the need to relieve irritation of the skin; the need to avoid blinding light; and the need to avoid excessive noise.

Personality Needs. There is more than a little disagreement among authorities as to which are the most important personality needs. However, a tentative classification of the personality needs might appear as follows:

1. *Affection*—satisfied by being loved by one's family and being liked by one's friends for what one is rather than for what one does. Such affection is expressed verbally or by demonstrations of loyalty, sympathy, understanding, consideration, etc.

2. *Belongingness*—satisfied by having a place in a social group of friends and acquaintances and in a close cohesive group, e.g., the family.
3. *Achievement*—satisfied by excelling in vocational or avocational activities.
4. *Independence*—satisfied by being able to take responsibility and to make independent choices.
5. *Social approval*—satisfied by having what one does appreciated and thought well of, admired, followed, etc.; by having a place in society at large, i.e., status.⁸

It should be noted that there is an implicit reciprocity connected with most of these needs. A person does not crave affection from one he does not love himself. Friendships are mutual by definition. When one belongs to a group, one's accepting attitude toward the others forms a part of the other members' feelings of belongingness. In a similar way the rather important need for helping another, i.e., comforting, aiding, or protecting a person requiring help is complementary to the *other's* need for being cared for.

Where basic needs leave off and less important ones begin must be determined somewhat arbitrarily. In the American culture at least and with differing emphases, perhaps, in all cultures, the five needs listed above are believed to be the most important and the most widely shared.

Among the personality needs of lesser importance are the aesthetic ones, e.g., for color, for certain kinds of sounds. Here, too, may be mentioned play, the desire to be with other people, dominance, and curiosity. Altogether there are thousands of minor desires far too numerous to record, most of which come and go with changes in environmental stimulation.

CHARACTERISTICS OF NEEDS AND GOALS

The Need Develops in Sequential Stages. In order to understand how a need functions in the life of a person, we will just cite a familiar example—the need for food. We will start with a person who has just finished an adequate meal.

Stage 1. At this period, there is no tension connected with the need for food. The need is satisfied and the organism is in equilibrium.⁹

Stage 2. After a relatively long period of time the *latent* stage begins. Now the state of tension is relatively weak and the person is not consciously aware of its existence. It does, nevertheless, bring about certain physiological changes and influence thought processes in such a way that images and thoughts of food become more frequent as the tension increases.

Stage 3. With increasing time, the need becomes *potential* or fully conscious through the occurrence of sensations of hunger. Now the person has a more or less constant stream of thoughts concerning food, and the tension is experienced as unpleasant, the unpleasantness increasing as the need tension increases.

Stage 4. The need enters the *active* stage when it has overcome the inertia of the person and arouses him to food-getting or food preparation.

Stage 5. Assuming no barrier intervenes, food is then eaten, the need tension is discharged (which is experienced as pleasant), and the state of *equilibrium* as in *Stage 1* is restored.¹⁰

In general any need which is satisfied easily and with little effort does not affect adjustment. Since all persons receive sufficient air and, except in unusual circumstances, enough liquid, these needs are seldom involved in adjustment problems.

Characteristics of All Needs. From the above example, we can derive the following characteristics of all needs. (1) The degree of tension corresponds to the strength of the need—the weaker the need the less the tension; the stronger the need the greater the tension. (2) When a need is latent, the person is not consciously aware of its existence but thought processes are likely to be influenced by the need as tension increases. (3) After the tension reaches a certain degree of intensity (potential stage), it is experienced as unpleasant, and its unpleasantness increases with the increasing tension. (At this stage the need is usually conscious, but this is not necessarily the case with personality needs.) (4) When a need enters the

active stage, the person engages in activity directed toward the goal (if the goal is known), or is spurred to decrease the intensity of the tension in some way. (If needs are anticipated by others and supplied to the person, the need may never become conscious.) (5) When the goal is reached, the tension is discharged and the need loses its power to impel activity. The tension discharge is experienced as pleasant.

Needs in Relation to the Environment. The need for food obviously arises internally. No environmental stimulus is necessary for its arousal. It can be affected by the environment, however, in that during the latent or in the potential stage, the perception of a goal-object, *e.g.*, an orange, may result in pushing the need into the active stage. Many needs are of the same character. On the other hand some needs may be evoked by an event. The approach of a friendly dog may evoke the desire to stroke it. If one suddenly receives a fist in one's face, a sharp and burning desire for retaliative action may be born.

The social environment is particularly potent in determining needs. As Lewin states, "The needs of the individual are, to a very high degree, determined by social factors. The needs of the growing child are changed and new needs induced as a result of the many small and large social groups to which he belongs. His needs are much affected, also, by the ideology and conduct of those groups to which he would like to belong or from which he would like to be set apart. The effects of the advice of the mother, of the demand of a fellow child or of . . . [the conscience] . . . are all closely interwoven with socially induced needs. . . . The culture in which a child grows affects practically every need and all his behavior."¹¹

Difference Between Organic and Personality Needs. Above we have discussed characteristics of goals and needs that supposedly apply to both organic and personality needs; now let us turn to differences between them. (1) Although it is generally held that the basic organic needs are inborn, no such supposition can be made for personality needs; to what extent, if at all, they are inborn or whether they may be said to derive their motivating power from the organic needs is still far from

clear. (2) Personality needs are much less tied to specific organs than are organic needs. (3) Their tension is not built up at regular intervals of time as is the case with many of the organic needs, *e.g.*, those for food, air, liquid.

THE INTERRELATION OF NEEDS

Predominance of a Need. One need (or a combination of needs) may be dominant at a certain time and inhibit or subordinate without any conflict almost all other needs. After prolonged exertion and lack of rest, the need for sleep becomes so intense that it becomes imperative. A candidate for the doctorate on the day before his examination lives in a world consisting almost entirely of his examination and himself. Although he must reluctantly respond to the impulses of the essential organic needs, the needs connected with the goal of acquiring his degree are of overwhelming significance.

Needs and Sub-Needs. One need may create a series of sub-needs which derive their impelling force only from the "master" need. A hostess, for example, seeking social approval may decide to have a dinner for certain admired guests. In planning the activity, she must choose her guests, send the invitations, plan the menu, purchase the food, straighten up the house, plan the after-dinner entertainment, etc. Each of these activities can be thought of as a sub-goal, action toward which is impelled by its own sub-need. These sub-goals are not, then, ends in themselves but merely means to an end. They would all disappear, in this instance, if some event caused a postponement of the dinner.

Fusion of Needs. When one goal satisfied a number of needs at the same time, we speak of a fusion of needs. To many adolescent boys, for example, having a job is the means of fulfilling the needs for achievement, independence, and social approval. A happy marriage may satisfy many needs including those for affection, sex, "belonging," helping someone, and social approval. A child who already feels somewhat insecure may feel doubly deprived by his mother's refusal to buy him an ice-cream cone. He loses not only the sensory gratification

but interprets the refusal as evidence of not being loved.¹² It is probably true that most behavior is directed toward goals which satisfy a number of needs; few goals satisfy only one need.

The Security Needs. It is quite evident that the personality needs are not entirely separate and distinct. The need for affection is closely allied to that for "belonging." The satisfaction of the two needs taken together may be considered basic to the feeling of security. Thus, a child who is loved, has friends, and "belongs," possesses certain essentials for a feeling of security.¹³ This condition does not guarantee that lack of satisfaction of other needs may not become sufficiently great as to threaten his security. In the case of the adult there is usually one more requirement—the prospect of a satisfactory future. If, for example, a person knows he has an inoperable cancer, or that technical progress is gradually making obsolescent his lifetime specialized skill, he can not feel fully secure. Nor can many adults in a world where wars and depressions remain probabilities be free of some feeling of apprehensiveness. The completely secure person (if he exists) feels serene and relaxed rather than tense; he likes people, feels kindly disposed toward them, is at ease with them, and consequently is not easily hurt. Since he does not feel the need for keeping his behavior under rigid control, he can speak and act in a natural and spontaneous manner.

For a contrasting picture, we may cite the description of the insecure child as given by Plant. ". . . The insecure child gives . . . the picture of being at sea, of being panicky, of being anxious, of fearing disaster at every turn without being at all sure as to what will be the character of the disaster."¹⁴ Presumably the behavior of the insecure adult is very similar.

The Adequacy Needs. One's wish to achieve and to have one's achievement appreciated illustrates the fusion of the needs for achievement and for social approval. These needs, together with that for independence, can also be subsumed under the heading of the need for a feeling of adequacy. If an adult's vocational or avocational life is rewarding, his responsi-

bility and freedom to carry out his own purposes are consistent with his abilities and wishes, and if his accomplishments and behavior are appreciated by others, he is presumed to feel adequate. Adolescents are reported to have the additional requirement of normal height and weight with a physique and facial appearance appropriate to their sex.¹⁵ To have a feeling of adequacy means that one evaluates himself as an estimable person; he esteems himself and has confidence in himself. The opposite state is called a feeling of inferiority or inadequacy, a diminished feeling of personal worth or a condition of low self-esteem.

It will be remembered that the need for achievement was said to be satisfied by excelling in vocational or avocational activities. What "excel" means should be explained further. All persons set standards for their own achievement—based to some extent upon the expectations of others—but in any case accepted by the person as his own goal before they are meaningful. The standard that one sets is called the *level of aspiration*, and in the average person, as has been pointed out in earlier chapters, it tends to correspond to a realistic expectation, *i.e.*, an achievement within his capacity. If a person's achievement falls in the region of his level of aspiration, he has a feeling of success. If his achievement falls seriously below his level of aspiration, he has a feeling of failure.

Interrelation Between Security and Adequacy Needs. To a certain extent even the security and adequacy needs overlap. Prolonged or repeated failure may so destroy a person's self-esteem that he considers himself also unworthy of being loved. Marked insecurity may also result in a person's distrust of his own abilities. "Case studies . . . and experimental data . . . show that change in group status (for instance, gaining recognition or love or being rejected by an individual or a larger group) is, *in many respects*, equivalent to success or failure."¹⁶

Interests and Needs Interests are based on one or more needs which have become associated with certain kinds of expression and are directed toward certain objects (things, people, institutions, beliefs) which satisfy the need. "The concept of

interest . . . takes the needs for granted. A man enters politics and almost overnight much of his behavior becomes oriented in such a way as to further this interest. This is certainly a fact of significance and it can be stated without considering what combinations of needs prompted his decision or what needs are satisfied by his political activity." ¹⁷

According to Langer, "Our *interests* are determined, for the most part, by a fusion of several needs. Activities that can offer satisfaction to many different needs at the same time will absorb our interests. Insofar as the activity associated with an interest performs this function, we find it easy and enjoyable. When it fails to meet these requirements, we lack enthusiasm and find the activity 'hard work. . . .' One person likes one kind of work; another dislikes it and prefers something quite different. Neither one is able to understand the other's likes or to explain his own in acceptable terms. Each of them is being influenced by his own needs and the possibilities of gratifying them through a particular type of activity." ¹⁸

Thus interests can be considered essentially (but not entirely) equivalent to a fusion of needs, and although no further references to interests will be made, the same general analysis made of needs can also be applied to interests.

SOURCES OF FRUSTRATION OR THWARTING

Thwarting may be produced by (1) physical factors in the environment, (2) social and societal factors, and (3) economic factors. These three are primarily *external* factors. Frustration may also be caused by (4) personal defects or limitations, (5) incompatible needs or goals, and (6) the individual's moral standards. The last three are *internal* factors sometimes grouped together under the heading "conflict," which implies an almost equal balance between two forces.¹⁹

Physical Factors in the Environment. Important needs may be thwarted by natural obstacles or events in the inanimate world such as barrenness of the soil, floods, drought, and earthquakes; less important needs may be frustrated, for example, by the discovery that the mountain road along which one is

driving is cut off by an avalanche, an automobile which "refuses" to start, the skating pond not yet frozen over.

Social and Societal Factors. Perhaps the most frequent source of thwarting in children's lives comes from the restrictions and prohibitions placed on them by adults, and it is probably true that most thwartings in adult life result from the activities of other individuals. A few examples may be cited: a woman who is seeking to make friends is snubbed by her neighbor; a young man is refused a dance by a popular girl; a man about to park his car in a certain space on the street finds that it has just been pre-empted. Other social thwartings are less trivial. A politically ambitious man finds that his expected nomination for senator will not be made; a clerk works hard for promotion but is denied it; an employee is fired at the whim of an employer—these are frustrations which present the individual with a serious adjustment problem.

Any rule, custom, prejudice, ordinance, or law with which the individual is not in sympathy constitutes a societal thwarting. Of course if the individual feels that the rule or law is justified, the thwarting must be considered only partially societal in nature because his own values will be involved as well. For the small-town woman teacher, prohibitions against marriage are common, and some communities deny her the right to live in an apartment. Among the most damaging thwartings are those which occur as a result of prejudice against members of minority groups, such as Negroes and Jews. The emotional tension engendered by such thwartings is unusually strong in communities in which there is a pretended, but not actual, absence of race prejudice. Such a situation frequently reinforces feelings of insecurity and inadequacy on the part of the minority group members and may arouse a corresponding sense of guilt in the majority group member.

Economic Factors. The direct and indirect thwartings caused by insufficient income are too obvious to require elaboration. Millions of American families have incomes so low that they find it difficult to satisfy fully even their needs for food and proper temperature (shelter), and those with slightly

higher incomes commonly find that lack of money interferes with an adequate fulfillment of many of their personality needs.²⁰ And, too, we must realize that because of the common though erroneous belief that one's income is a measure of one's value to society, many people suffer from a feeling of deficient personal worth.

Personal Defects or Limitations. Personal deficiencies, either real or imaginary, may constitute a source of thwarting. It is easy to see how certain organic conditions may thwart needs. The boy with a weak heart is unable to engage in strenuous games with his peers. The adolescent girl who is oversize may find herself without dates. It should also be recognized that many physical and social thwartings may be attributed by the individual to defects in his own ability or personality.

Incompatible Needs or Goals. An individual may, so to speak, thwart himself when he has contradictory desires. A boy may wish to dive properly in order to gain the admiration of his friends but is afraid he may dive so poorly that he will not only hurt himself but lower their opinion of him. A young couple may wish to have a child but the husband may also wish to obtain a Ph.D. degree, which requires three years' study in a graduate school. An adolescent may wish to become independent of his parents but feel unready to assume an adult's responsibilities. Incompatible goals are found when a girl must choose between two or more attractive suitors, when any person must decide among two or more offers of positions.

The Individual's Moral Standards. The individual's code of ethics, moral standards, or conscience may thwart an urge. Most children are confronted at some time with the conflict between stealing and not stealing an object. Stealing may bring the thrill of danger, the admiration of the gang, the possession of the object, but, on the other hand, the fear of being caught and punished may act as a strong barrier. But more important, if the child has incorporated into his personality the high moral standards of his parents and other adult associates of his earlier years (and consequently accepts the prohibition against stealing), the prospect of suffering "pangs of conscience" acts as a

further barrier to the contemplated act. Cheating in an examination versus not cheating places the child in a similar dilemma. Particularly severe conflicts often center around the sex urge. Although moral conflict should be classified as one variety of incompatible needs, it has been given separate treatment because of its unique feature, *i.e.*, fear of punishment and "pangs of conscience" or feeling of guilt.

Conflicts may center not only about contemplated actions but around those already carried out. When this is the case the individual's feeling of guilt prompts him to make amends for his deed, but he is held back by the anticipated unpleasantness connected with the loss of prestige, the social disgrace, and the possible punishment which may be the consequence of his act of restitution.

FACTORS AFFECTING RESPONSES TO THWARTING

Thwarting always results in increased tension and nearly always in an increased feeling of unpleasantness or distress. (In some instances, thwarting may not be unpleasant, *e.g.*, when momentary thwarting is expected by the person as in an evenly matched game of tennis or in playing solitaire.) Other effects of thwarting depend upon a number of variables: (1) the type of thwarting, (2) the previous experience of the person thwarted, (3) the person's interpretation of it, (4) the source, *i.e.*, whether personal or impersonal, (5) the nature of the need, (6) the actual possibilities of satisfactory solution, and (7) the degree of awareness on the part of the person thwarted.

The Type of Thwarting. The specific responses to thwarting obviously depend somewhat on the type of thwarting. An environmental obstacle can not usually be responded to in the same way as a moral conflict; a social thwarting, *e.g.*, a snub, and an economic thwarting, *e.g.*, a decrease in pay, are not likely to be handled in the same way. At a certain level of abstraction, similarities may be found, but the actual behavior is likely to be different.

Previous Experience. Recent previous experience may affect the response to thwarting by lowering the threshold for an emo-

tional response. A series of frustrations of minor needs may cumulate in such a way as to produce either an outburst of anger or a feeling of profound depression. The history of thwartings of the same kind is also important in that successful previous handlings are likely to result in prolonged, energetic, and more appropriate behavior in the present situation. Even remote experiences may affect present response. An insecurity feeling based on insufficient love, friendship, and "belonging" in childhood may result in the development of insatiable security needs and at the same time incline the person to view all thwartings as threats to his personality.

The Person's Interpretation. The degree to which a person interprets a thwarting as a threat to his personality depends on his self-evaluation—on how secure and how adequate he feels. Since nobody feels as secure or as adequate as he would like, it often happens that frustrations of personality needs are interpreted as threats; the more insecure and inadequate one feels the more likely he is to interpret thwartings in this way. For example, a man who felt relatively secure would probably respond to a sweetheart's rejection of his proposal of marriage with a relatively short-lived feeling of humiliation. A man who was insecure, however, might interpret a similar event as a threat, *i.e.*, he would feel that he was unworthy of being loved and incapable of being valued by others, which would result in his devaluating himself. Very distressing feelings such as these may sometimes be alleviated or avoided by the use of indirect methods of tension reduction (which are discussed in the next chapter). Frustration based on moral conflict may also cause the person to feel shame and guilt merely because a conflict exists—because he was unable to follow the dictates of his conscience immediately.

The Source. Behavior in response to thwarting will differ also depending on whether the source of the frustration is personal or impersonal. Although impersonal frustration may cause anger and diffuse feelings of hostility, anger and focalized feelings of hostility are likely to be mobilized when there is a person who can be identified as the frustrater. In this case a

new need comes into being—that for aggression—which may for a time even take precedence over the thwarted need. Thus a boy who wishes to go out and play ball with his friends and who is mischievously locked in his room by his brother is very likely to seek out his brother upon his release in order to vent his aggression toward him even though it means delaying further his playing ball. Impulses to aggression are likely to be particularly strong when the frustration is felt to be unjust.

The Nature of the Need. The thwarting of minor needs seldom causes anything but temporary and mild distress. For example, if a young man while dressing notices that his last clean shirt is a striped one but finds that he has no plain-colored ties in acceptable condition, he is likely to be annoyed for a while and later to forget all about it. The death of a dearly loved person, on the other hand, usually frustrates a number of basic personality needs and may involve months or years before adjustment can be made. In general the thwarting of many needs is more serious than the thwarting of one. All other things being equal, the thwarting of sub-needs related to a dominant need is not very serious because usually there are alternative means of satisfaction.

The Possibilities of Satisfactory Solution. The effect of frustration depends in part on the actual possibilities for other means of satisfying one's needs in the environment. In general, the greater the actual possibilities, the more sensible the behavior. The inmates of German concentration camps, for example, found almost no avenues for the satisfaction of any personality need. As long as hope remained, there was some incentive for enduring the extreme frustrations of the camp but when hope was dim they could be borne only by adopting such methods as rigorous suppression, grandiose fantasy, and extreme regression.²¹ In general, hope or the expectation of a change for the better in the future makes the endurance of frustration easier. Of course, the reality situations also include the capabilities in the person as well. Even though a wall could be scaled by a strong person, it does no good if one does not have the strength and agility necessary for scaling it.

Some needs can be satisfied by but one specific goal (e.g., the needs for food, sleep). Others may be satisfied by any one of a number of goals. A person who is too warm may obtain some degree of relief by sitting near an electric fan, retiring to a cool cellar, or going to an air-conditioned room. Needs with a number of readily available goals seldom constitute adjustment problems.

Usually when a number of goals are related to a single need, the goals vary in attractiveness. A dull boy, for example, has a strong need for achievement. His goal is to excel in his studies, but he finds he is unable to do so. He then turns to athletics (a less attractive goal to him), but still unable to achieve success, finally turns to stamp-collecting (still less attractive) and endeavors to make his collection an outstanding one. The stronger the need, the more ready is a person to accept a less attractive goal. "The hungrier person is usually satisfied with poorer foods."²²

A strong barrier between the person and his goal is likely to call forth strong efforts to overcome it. A barrier that is perceived or understood by the person as impossible to overcome evokes little or no effort.

The Degree of Awareness. In the example cited--the need for food--it was stated that the need was in abeyance immediately after eating, that with the passage of time (*latent* stage) there was no consciousness of the need but that thought processes were affected. With increasing time the potential stage occurred in which the need was fully conscious. Finally the *active* stage arrived and action was taken to obtain food. It might be inferred from this description that consciousness was necessary to elicit action. It was also stated, however, that personality needs were not necessarily conscious in the potential or even in the active stage.

Certain psychologists take the view that "most behavior is actuated by bodily needs rather than conscious wishes."²³ They present as evidence the experiments on rats whose adrenal glands were removed, thus making it essential for them to consume large amounts of salt in order to keep alive. Even though

it can not be assumed they were conscious of this fact, when offered salty water they drank it in preference to plain water and in sufficiently large quantities to keep themselves alive. Other evidence comes from the case of the infant with rickets who spontaneously selected from among many equally accessible foods sufficient cod liver oil to cure the disease. Undoubtedly these are examples of effective goal-directed behavior without the subject knowing just *why* he chose a certain beneficial food. The question is by no means settled as to how typical or frequent such behavior is. Whether *most* behavior is actuated by unconscious organic needs or *most* behavior stems from basic personality needs acquired too early or too gradually to be recognized can hardly be settled here. There is, however, increasing evidence to show that, while persons vary greatly in insight into their own actions, everyone behaves at certain times without being conscious of *why* he acts in that particular way.

In adult behavior the basic *organic* needs are likely to become conscious when the need is sufficiently intense. The basic *personality* needs are likely to become conscious at a certain level of intensity unless they are kept from consciousness by some other factor (*e.g.*, another contradictory need, a fear, the conscience). Actually we know very little about what makes a personality need sufficiently intense to become conscious. A sudden deprivation may make it conscious or the perception of another person whose personality need is conspicuously gratified may do so. Reading fiction or going to the movies may also result in a need becoming conscious for the first time. As mentioned above a person may have opposing needs or contrary behavior tendencies. If he is aware of the conflict he may attempt to resolve it rationally by whatever methods seem promising. If, however, he is neither aware of the needs nor of the resulting conflict, his behavior may take unusual or apparently nonsensical forms.

Clinical Example of Unconscious Motivation. An example of unconscious motivation is given by Masserman. "A successful executive who, for various reasons, hated the responsibilities

of marriage and fatherhood, was obsessed many times a day with the idea that his two children were somehow in danger, although he knew them to be safe in a well-run private day-school to which he himself brought them every morning. As a result, he felt impelled to interrupt his office routine thrice daily by personal calls to the school principal. . . . Similarly, the patient could not return home at night without misgivings unless he brought some small present to his wife and children although, significantly, it was almost always something they did not want." ²⁴

Different interpretations of the executive's behavior might be made in accordance with differing points of view. It is probable, however, that the man himself was unaware of the reasons for telephoning the principal and for giving inappropriate presents to his wife and children.

Hypnotically Induced Conflict. The study of hypnosis has revealed a form of unconscious conflict. Many persons can be hypnotized through a process of suggestion and thereby put in a state of hypnotic sleep in which they will do almost anything the hypnotist requests them to do. When "brought out" of the hypnosis they often can not recall what happened during the period of trance. Furthermore, individuals may be given directions during hypnotic sleep which they later carry out in the waking state but which they can not recall. Thus, in effect, subsequent behavior based on such instructions is unconsciously motivated. One of the most convincing demonstrations of the existence of "unconscious conflict" by means of hypnosis was made by Erickson. He described his procedure as follows:

During profound hypnosis the subject (a confirmed smoker) was instructed to feel that smoking was a bad habit, that he both loved and hated it, that he wanted to get over the habit but that he felt it was too strong a habit to break, that he would be very reluctant to smoke and would give anything not to smoke, but that he would find himself compelled to smoke, and that after he was awakened he would experience all of these feelings, though not remembering that he has been told to have them.²⁵

During a casual conversation after the subject was awakened, the hypnotist offered him a cigarette. The subject said he preferred his own brand and reached for them. Then ensued a series of delaying activities. These included not being able to find his cigarettes, then after finding them mislaying his matches, then mislaying his cigarettes, then finding them again and dallying with them, then becoming so engrossed in the conversation that he let his match go out. After he finally succeeded in lighting his cigarette he let it go out, and after lighting it again he "accidentally" put it out. During all these activities he appeared to be greatly embarrassed at being so awkward. His actions reflected faithfully the conflict which had been hypnotically induced, but he was quite unaware of the origin of his difficulties.

Importance of Awareness. The extent to which a person is aware of needs and impulses is a matter of practical importance. In general, an individual's control of his behavior in response to a need depends considerably upon the extent of his awareness of the need. Unconscious needs are unconscious for a reason—because they are incompatible with the self-esteem or with the conscience. One of the major aims of modern psychotherapy is to bring to full awareness those impulses and feelings which are not recognized at all or at most are only dimly realized. When the need becomes clearly evident, the individual is in a much better position to work out a permanent solution to his life's problems.

Influence of Unconscious Conflict on Adjustment. Among those who admit the existence of unconscious conflicts there is disagreement concerning the extent to which the conflicts affect adjustment of the "normal" individual. Allport, for example, is inclined to think that their effect has been overemphasized. He says:

Although the importance of conflict in the evolution of the individual personality is under no circumstances to be denied, it seems that only in exceptional cases is the psychoanalytic emphasis on its unconscious operation fully justified. Most conflicts, psycho-

analysis to the contrary notwithstanding, are conscious in all essential particulars. . . .²⁶

Brown, on the other hand, states:

The most important discovery of modern psychodynamic theory is that of unconscious conflict and the mechanisms of its resolutions. . . . Unconscious conflict plays an important role in the growth of the "normal" personality. . . . In fact, much of the behavior of the "normal" adult is determined by unconscious conflict. . . .²⁷

Only by further research and study can evidence for the relative correctness of these two points of view be obtained.

EMOTION AS A REACTION TO FRUSTRATION

The role of emotion as a reaction to frustration is far from clear. We have both common sense and experimental evidence that thwarting is likely to cause anger but that it does not necessarily do so. Mild frustrations, especially during play, may have a tonic effect and result only in an increase in energy. When strong emotions are aroused either through a relatively severe frustration or through the cumulative effect of a series of minor ones, the effects may be good or bad depending on the situation. As has previously been pointed out in Chapter IV, where some freedom of action is possible, when the situation calls for increased energy, *e.g.*, attack on an enemy or escape from danger, strong anger or fear may be helpful. In situations calling for concentrated mental effort, strong emotion is likely to be a hindrance to efficiency.

Undesirable Aspects of Frustration. In almost all situations of frustration, emotions are experienced along with varying degrees of bodily disturbance. A person may feel fearful, helpless, angry, despondent, etc. When frustration occurs in a situation in which the person feels he is powerless (*e.g.*, the death of a loved one, humiliating failure) prolonged grief or despair are apt to ensue. It is possible in certain circumstances, *e.g.*, the battle front, for frustration to be so extremely severe that a complete disorganization of physical and mental functions occurs.

The following case illustrates the rather severe emotional and bodily symptoms which sometimes occur in persons in a situation of strong conflict with which they feel completely unable to cope.

A man was a successful salesman as long as he worked in his father's place or for another firm where he was treated fairly. He then became a salesman for still another firm. The manager was a blustering sort of man who always disapproved, never praised, and never gave any credit for performance. The salesman developed dizziness, a moderately high blood pressure, attacks of trembling and of anxiety, particularly when he sat in the barber's chair. His symptoms became so marked that he had to take a vacation. During this period he felt somewhat better, but when he returned to work the symptoms reappeared. Then he went to a psychiatrist who discovered that he felt humiliated and downtrodden all the time; although he resented this intensely, he never protested because he was afraid of the counterattack in the form of being discharged. This situation was one of intense conflict. After considerable treatment, the patient became able to demand different treatment, to complain to the owners, and in fact either to put the manager in his place or to look for a better job—steps hitherto impossible because of his feelings of helplessness and worthlessness and the acute conflict situation. Sometimes such a good outcome is impossible if, for instance, there is no possibility of another job. Then psychology can help little or not at all.²⁸

Desirable Aspects of Frustration. Although the thwarting of needs is usually considered to have a baneful effect on the personality, this is by no means always the case. Unfortunately the innocuous character of many thwartings and the beneficial effect of others has received very little of the researcher's attention. Consequently it is possible to do little more than to mention certain criteria by which serious and less serious adjustment problems may be distinguished.

It appears likely that absence of thwarting is not conducive to the development of a differentiated personality. J. F. Brown states: "Without any blockage, the individual remains a medi-

ocrity, stupid, unimaginative, with 'cowlike content'." ²⁹ The study of certain mountain communities by Sherman and Henry ³⁰ supports this opinion. In the communities where conditions were extraordinarily simple and few frustrations were encountered, these investigators found that the personalities of the children as reflected in emotional expression, aspirations, conflicts, etc., developed very little after the years of early childhood. They also found, as might be expected, that the children had great difficulty in responding adequately to novel situations.

It is probable that a certain amount of thwarting is required in order to develop the necessary understanding of one's own limitations and an adequate conception of reality. It is also probable that the experience of meeting problems and making an adequate adjustment is essential for the development of an independent, self-sufficient individual. Although the process is pre-eminently frustrating, an individual must learn to renounce many selfish desires as he emerges into full status as a responsible member of society.

THE EFFECTS OF HUMILIATION

Up to this point we have spoken of thwarting, frustration, and deprivation of a need on the assumption that these concepts were familiar enough to be understood without definition. In dealing with humiliation, however, it becomes necessary to distinguish it from the previous concepts. Thwarting and frustration are used synonymously. Both terms refer to the prevention of a need from being satisfied and imply that the need was arousing goal-directed behavior at the time of the blocking. As Dollard, *et al.*, put it, "In order to say that a frustration exists, then, one must be able to specify two things: (1) That the organism could have been expected to perform certain acts, and (2) that these acts have been prevented from occurring." ³¹ The term deprivation is used when the person's need is being satisfied at the time, and he is taken away from the goal. For example, a child who was prevented from getting an ice-cream cone would be thwarted or frustrated; if he was

eating the cone and had it taken away from him or accidentally dropped it down a sewer he would be deprived. Even though in some instances the distinction breaks down it is an aid to clear thinking to note the exact meanings. For our purposes we shall treat frustration and deprivation as similar in terms of their psychological significance.

When we are the butt of ridicule, accused of something of which we are innocent, disapproved, scolded, censured, belittled, treated with contempt, "brushed off," or scorned we suffer from a direct attack on our self-evaluation (security and adequacy) regardless of whether the acts of others towards us were designed to injure us. Although we are not frustrated, since no one has blocked the satisfaction of a need, nor deprived, since the satisfaction of a need is not being taken away from us, nevertheless psychologically we are in a similar state to the frustrated or deprived person. Consequently our reaction to the situation is similar. We feel the necessity for making a response which will restore our self-evaluation, to reduce the unpleasant tension.

MOTIVATION OF BEHAVIOR

Although motivation has already been discussed in connection with learning, and this chapter has dealt with many of its phases, there are certain broad questions which have not yet been raised. Does all behavior originate in needs? A need was defined as a state of tension in the person which tends to direct his behavior toward goals which will relieve the tension. It would appear that needs defined in this way account for all behavior. This does not mean that inborn organic needs are basic to all behavior: that question is left open. Nor does it mean that all behavior is ultimately based on the basic personality needs. There are many additional needs created by the environment.

There are two important controversial questions concerning the motivation of behavior. One is, Can all motivation be traced to organic needs? The other is, Can all motivation be traced to basic needs (organic and nonorganic) which are the

same for all human beings? Masserman, among others, holds that all "behavior is actuated by the physiologic needs of the organism and is directed toward the satisfaction of those needs."³² He admits that it is possible for certain forms of behavior to have originated in a physiological need but later to be carried out more or less independently of it. He cites as evidence "a male child castrated in early infancy rarely develops 'sex drives,' but if castration occurs after he has had satisfactory heterosexual experiences, he may continue to seek and consummate them successfully despite the absence of the specific hormonal stimulants."³³ In analyzing the evidence for the origin of all behavior in organic or physiological needs, the evidence appears to be inconclusive. It may be that some behavior, at least, does originate in an organic need which later is satisfied by other means, but the behavior continues on the basis of meeting a personality need.

LEARNING, NEEDS, AND THE ADJUSTMENT PROCESS

Certain needs are satisfied by the organism without the necessity of learning. The infant takes care of his own needs for air, elimination, rest, and sleep and—when the nipple is brought in contact with the skin in the region of his mouth—he will suck. Later, learning affects the time and manner of eating as well as the kind of food eaten. It also modifies the eliminative process. Rest, sleep, and breathing remain largely independent of learning. With the personality needs, the means of satisfying them—insofar as they are within the province of the child to satisfy them—are largely learned.

Most Methods of Tension Reduction are Learned. How are methods of tension reduction learned? In Chapter IX it was pointed out that when an organism encounters an obstacle to the satisfaction of a need, it "tries" one reaction after another until the tension is reduced. After repeated occurrences, the successful response tends to be made at once. Of course the "trials" do not necessarily involve wholly motor activities; thinking may substitute for physical acts.

What is a successful response? A successful response is one

which reduces the tension; it may or may not be the one which the impartial observer would say is most appropriate to the situation. If it is appropriate, learning will take place which will be conducive to the person's long-term adjustment; if it is not, it may serve immediate goals at the expense of long-term goals. In general, the younger the child the more likely is his learning to be influenced by the immediate tension reduction and the accompanying relief of distress.

Adult Recognition of Functional Consequences. As children become older and especially when they become adult, their learning is more clearly and certainly affected by the functional consequences of their behavior.³⁴ They are less affected by the immediate relief of distress and can bear this in the interest of gaining a more distant but more important goal. Of course all adults have some habitual ways of behaving which are no longer functionally useful. It is important to note here that there is no clear line between those who adjust with a fair degree of success and those who are notably unsuccessful in their adjustment, *e.g.*, neurotic individuals. Such maladjusted persons are not able to learn certain kinds of things on the basis of functional consequences, but continue to control most of their behavior on the basis of immediate tension reduction. According to Kubie:

. . . the rigid ultimate forms of these repetitive patterns seen in neuroses have been reached only after a long process of trial and error, during which many and varied patterns of neurotic effort have appeared and been abandoned. The neurotic pattern which finally persists, and which becomes most repetitive . . . proves invariably to have been the one that served the largest amount of neurotic demands, or which gave the patient the greatest *temporary relief from tension*.³⁵

Thus we see that varied behavior does not invariably lead to a successful outcome as measured by adjustment to reality. Why such people fail to learn socially appropriate ways of behaving can be determined only by an intimate knowledge in each individual case of why the appropriate forms of behavior failed to provide the necessary satisfactions.

The Vicious Circle. Although many neurotic symptoms, *e.g.*, chronic fatigue, great difficulty in arriving at decisions, do not lead to a sounder adjustment from the standpoint of society, they do not lead to a worse adjustment either. Instead, a state of partial adjustment ensues in which efficiency, happiness, and social feeling are reduced, but not to the point where life is unbearable. Every neurosis brings moderate gains together with major losses.

There are other kinds of both normal and neurotic behavior, however, which definitely lead to an increasing maladjustment because they establish a vicious circle.

The child who resorts to enuresis as a means of venting resentment toward indifferent or harsh parents and thereby elicits still more rejection and loss of love; the business man who, when faced by the prospect of failure, becomes alcoholic and thus incapacitates himself for taking what might have been effective recuperative measures; or the woman who jealously nags her husband and in so doing destroys such residual affection as he may have for her—these are everyday examples of the self-defeating, short-sighted, non-integrative strategy which constitutes the 'vicious circle'. . . .³⁰

SUMMARY

The term adjustment refers both to a *process* and to a *state*. As a *state* it refers to a harmonious relationship between the person and the environment. The degree of harmony is in part dependent on certain potentialities within the person, in part upon the character of the environment. In some cases maladjustment arises only from the interaction between the person and the environment—both being adequate when considered separately. A person is said to be adjusted when he is so related to a reasonably adequate environment that he is relatively happy, efficient, and has a 'proper degree of social feeling.'

A need was defined as a state of tension in the person which tends to direct his behavior toward goals which will relieve the tension. A goal was defined as an activity or state which to some extent satisfies an individual's need or needs. All needs may be divided into two groups—organic needs and personality

needs. The most important personality needs are thought to be those for (1) affection, (2) belongingness, (3) achievement, (4) independence, and (5) social approval.

As the tension of a need increases, it is experienced as unpleasant. This tends to produce action to reduce the tension. Some needs arise internally, others may be evoked by the environment. The needs for affection and "belongingness" may be combined as the *security* needs; those for achievement, independence, and social approval may be grouped together as the *adequacy* needs.

Frustration may arise from (1) physical factors in the environment, (2) social and societal factors, (3) economic factors, (4) personal defects, (5) incompatible goals, (6) the person's moral standards.

Thwarting always results in increased tension and nearly always in a feeling of unpleasantness or distress. Other effects of thwarting depend upon (1) the type of thwarting, (2) the previous experience of the person, (3) the person's interpretation of it, (4) the source, *i.e.*, whether personal or impersonal, (5) the nature of the need, (6) the actual possibilities of satisfactory solution, and (7) the degree of awareness of the person thwarted. The effects of humiliation are similar to those of thwarting.

Frustration does not always have a baneful effect on adjustment; in fact, a certain amount of thwarting is essential for personality development.

All behavior originates in needs but not necessarily in organic needs.

In learning to adjust, children are more likely to be affected by the prospect of immediate tension reduction; adults are more likely to be influenced by the functional consequences as related to long-term goals.

QUESTIONS AND EXERCISES

1. Draw up plans for:

- a. A society in which thwarting from societal and economic factors will be reduced to a minimum.

b. An environment in which thwarting from physical factors would be reduced to a minimum.

How practical are your suggestions?

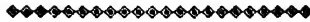
2. Give examples of thwartings which appear to improve personality development.
3. Criticize the use of the terms "need" and "goal" in the chapter. Can you suggest better terms or better definitions?
4. How many examples can you give of needs which can be fulfilled by only *one* goal?
5. That needs can be thwarted by an insufficient income is obvious; can the possession of an excessive income also thwart needs? If so, how?
6. Why is being humiliated not considered a form of frustration?
7. Some psychologists claim that the listing of any needs is a hindrance rather than a help in understanding human behavior. What arguments can you advance in favor of and against this view?
8. What is the difference between adaptation and adjustment?
9. One point of view is that hypnosis cannot prove anything about unconscious conflict because the subject is motivated by a desire to please the hypnotist. Do you believe this could explain the behavior of the smoker who was hypnotized by Erickson?
10. Happiness, efficiency, and social feeling were proposed as criteria for a state of adjustment. Would you add others?

GENERAL REFERENCES

For further readings on needs see:

- Langer, W. C., *Psychology and Human Living*. Appleton-Century Co., 1913.
- Lewin, K., "Behavior and Development as a Function of the Total Situation," *Manual of Child Psychology*, John Wiley & Sons, 1946, Ch. 16.
- Murray, H. A., *Explorations in Personality*, Oxford University Press, 1938.
- Prescott, D. A., *Emotion and the Educative Process*, Washington, American Council on Education, 1938.
- Travis, L. E., and Baruch, D. W., *Personality Problems of Everyday Life*, Appleton-Century Co., 1941.

CHAPTER XIX



THE ADJUSTMENT PROCESS: TENSION REDUCTION

The aim of all methods of tension reduction is to restore harmony between conflicting tendency within the individual or between him and his environment. More specifically they are methods used to reduce the tension evoked by an unsatisfied need or a humiliation, and in so doing, to relieve the accompanying distress. As we found in the last chapter, unsatisfied needs are due to thwarting or frustration, or to deprivation. We also found that when one is humiliated, tension and distress are aroused which call for relief as does thwarting or deprivation.

The methods of tension reduction used may or may not be in keeping with the long-term goals of the person. They are always pointed, however, toward the relief of a momentary feeling of distress. We shall deal with these methods under the following general headings: (1) direct methods, (2) indirect methods, (3) compensatory methods, and (4) aggressive methods.

DIRECT METHODS OF TENSION REDUCTION

Direct methods include (1) renewed attempts to reach the original goal, (2) substitution of other goals, and (3) analysis and decision. The methods are typically conscious and rational. Usually the needs for which satisfaction is sought through these methods are conscious also.

RENEWED ATTEMPTS TO REACH THE ORIGINAL GOAL

Destroying or Removing the Barrier. The most direct response to a goal that is blocked is an attempt to destroy or remove the barrier. This is usually the action called for by physical barriers. An example from social life is that of a youngster

prevented from entering an athletic field by a bully. He may choose direct assault on the bully as the most appropriate behavior. Repeated onslaughts (of a less violent nature) on a social barrier may also result in its demolition, as is shown in the following instance. A college boy who came from an undistinguished home and who joined a fraternity low in the social hierarchy was anxious to become friendly with the social leaders of the college. He found, however, that even if he was able to secure an introduction to them, the leaders responded to his subsequent greetings with a blank stare or a noncommittal "hello." Instead of withdrawing to his room and indulging in self-pity, however, he frequented the college post office which all students visited at least once a day, cordially greeted everyone with whom he wished to develop an acquaintance, and carried on a conversation whenever he had a chance. As he had a likeable personality despite his propensity for "social climbing," this simple method enabled him by his senior year to become one of the most popular students on the campus.

The behavior of Demosthenes is frequently cited as a worthy example of direct action against a barrier of personal deficiency. As the reader may recall, Demosthenes was a Greek statesman who was unable to make public speeches because of a weak voice and minor speech defects. It is said that he practiced speaking with pebbles in his mouth and tried to strengthen his voice by shouting against the competition of the breakers on the shore of the sea. In time he became a great orator and a famous statesman.

The instances cited have been concerned with unaided individual efforts to remove the barrier; but in many circumstances in which individual efforts are futile, a joint attack with others who suffer from the same thwarting may be successful. Military and labor history afford many examples.

Seeking Another Path. When the barrier has been found to be immovable, the individual is likely to seek another path to the goal. This usually necessitates the development and try-out of other possibilities until a satisfactory alternative is discovered. Fisher gives a typical illustration:

"Observe the activity of a boy who has sighted a large red apple in the top-most branches of a tree. The sight of the apple has aroused an urge which would find its adequate consummation in the activity of gaining possession of, and eating, the apple. But the urge is temporarily blocked by the fact of the apple's being out of reach. . . . He endeavors to climb the tree. Failing at this he finds a long stick and tries to reach the apple but again he fails. Now he tries to shake the tree and cause the apple to fall, but the tree is too heavy. Finally he gathers some stones and succeeds in knocking the apple from the tree."¹

The plain girl who cultivates methods of pleasing people is another example.

Under what circumstances can such methods be used? The answer is, when the frustration is produced by external factors or when it is caused by personal defects which are subject to improvement. When the goal and the source of the thwarting are fairly evident, the conscious use of such methods is obvious good sense. The person who tries to overcome an inherent defect or who misjudges the strength of a social barrier will fail with these methods. It should also be noted that with this type of behavior, there is no reduction in tension until the goal is reached, or at least until sub goals (way stations on the road to the goal) are reached. Thus Demosthenes may have experienced some tension reduction when it became apparent to him that his voice was improving.

SUBSTITUTION OF OTHER GOALS

If attempts to reach the original goal fail, the person may consider a substitute goal. It will be recalled that a goal was defined as an activity or state that to some extent satisfies the individual's need or needs. The possibility of substitution depends, therefore, upon whether another goal will satisfy the thwarted need. In other words, only goals which will reduce the tension of the thwarted need have substitute value. To predict the substitute value of a goal, therefore, knowledge of what particular need is thwarted is essential. Suppose a man is planning to play tennis when it starts to rain, so he stays indoors

and plays bridge. If the goal of playing tennis was connected with the need for diversion, the substitute goal of playing bridge (assuming that it provided diversion) would discharge the tension. If, however, playing tennis constituted a goal for the needs of achievement and recognition rather than for recreation (the individual being an excellent tennis player but poor at bridge), playing bridge would not be a substitute goal and the tension would be unreduced.

Examples of Substitution. In many life situations, goals are related to a number of needs at the same time or to a fusion of needs. When this is the case the fulfillment of one of the needs by a substitute goal will result in partial tension reduction. For example, when a man's work brings in a sufficient pay check, but largely frustrates his need for achievement, he may spend long hours at home improving his ability as a sharpshooter and in this way reduce the tension of his achievement need, even though the need for social approval remains unreduced because of the absence of spectators to admire his performance. Through the tension reduction of this substitute goal, he is thus enabled to endure the unpleasant aspects of his work.

In many instances of vocational choice, one goal is consciously substituted for another. A man who wants to become a physician but is blocked by insufficient ability may substitute the occupation of laboratory technician. Others may make the same substitution because they are unable to afford a medical education. There are many other examples of substituting goals. Nearly everyone has had the experience when hungry of finding no really appetizing food on the restaurant's menu and thus being forced to substitute. It is not uncommon for married couples unable to produce children to find in adoptive parenthood a very adequate substitute.

Substitution of Partial Goals. "There is, for instance, the man who dreams of a palace and brings a few pieces of marble into his kitchen. There is the man who cannot buy a piano but who collects piano catalogs. Again we find the delinquent boy

who knows he will not be allowed to leave his reform school but who asks for a traveling bag as a birthday present." ² These examples are all illustrative of the substitution of a partial goal for the complete goal. One might argue that such goals are not substitutive at all, e.g., the man who collected piano catalogs would merely increase his distress. This would seem even more true of a psychologist who studied his own reactions to a self-imposed denial of liquid. To his own astonishment, he found that as his thirst increased his increasing tension was not enhanced but was reduced slightly by turning on the faucet and watching the water fall into the sink. In fact, he found it difficult to tear himself away from the kitchen.

In the instances cited the partial goals reduced the tension of the need connected with the original goal. This does not always happen, however, and the conditions under which it happens or does not happen are not well understood. It may be that a fairly complete renunciation of the original goal and a fantasy wish fulfillment associated with the substitute goal make it possible to provide the tension reduction.

Apparent Substitution. There are other forms of what appear to be substitute goals which are difficult to explain in terms of discharging or reducing the tension of the original need. For example, is the wife who has unsatisfactory sexual relations with her husband reducing the tension of the sexual need by her overindulgence in candy? Does the sensory satisfaction "make up" for the sexual lack? Does the purchase of a new dress by a college girl who has just failed a final examination reduce the tension of her adequacy needs? There is no sure way of answering these questions, but such examples do not constitute proof sufficient to overthrow the principle previously stated, *i.e.*, that only goals related to the need in question have substitute value.³ What probably happens in the above instances is that eating candy and buying a new dress are direct sources of pleasure and because they are, they naturally make a person feel better. If you stubbed your toe rather painfully on a bump in the sidewalk but found a five-dollar

bill when you involuntarily looked down, the pain would probably be just as severe as before, yet somehow you would not mind it so much.

A number of researches have been made on substitute *activity* but very few on substitute *goals*. A recent study compared similar acts (goals different) with similar goals (acts different). The experimenters found, as was expected, that the reaching of a similar goal resulted in much greater tension reduction than did the performance of similar acts.⁴

Other aspects of substitution will be dealt with in the sections on sublimation, compensation, and aggression.

Evaluation. Substitution of goals, by and large, aids both short-term and long-term adjustment. Obviously it can only be used by the frustrated person in situations in which there are more or less adequate alternative goals. Usually the person himself will know what need or needs he is trying to satisfy with the substitute goal, but when others are attempting to aid the adjustment of a person through the provision of a substitute goal, they are likely to be handicapped by not being certain of the character of the original need.

THE PROCESS OF PROBLEM SOLVING: ANALYSIS AND DECISION

Up to this point we have been concerned with responses to situations in which there was a barrier between the person and the goal. Now we will consider direct methods of handling frustrations which came about because of the conflict between incompatible needs or goals. When a person is confronted with two more or less equally desirable but contradictory goals, there are relatively few alternatives for behavior. He may renounce one of the goals, he may renounce both goals, or he may try to work out a compromise between them.

Process of Decision. Since the process of analysis and decision (essentially that of reasoning and problem solving) has already been described in Chapter XIV, we will merely call attention to some of the outstanding features here. Usually the process involves first getting as complete information about the

alternative goals as possible. Second, the person is likely to make a tentative decision favoring each goal in turn in an attempt to anticipate how he would *feel* if such decision were final. Often there is a great deal of vacillation involved at this point. Finally, an attempt is made to hold all the relevant factors in mind while one tries to give due weight to each of the factors and to get an overview of the problem in its entirety. During this final process, a period of incubation (*i.e.*, sleeping over the problem, deliberately not thinking about it for a period of time) is often helpful. Another device is to talk over the problem with a friend, a procedure which forces one to verbalize and bring out in the open aspects of the problem only vaguely thought through before. Because of this, a suitable decision is often reached through this device. The actual process of decision may not be as systematic as this description implies, but in most instances, the major steps are taken unless the emotional aspects of the choice are overwhelming.

Examples of Choice. Some examples of conflicts have already been given: the girl who must choose between two suitors; the person who must decide between two offers of positions. A story by Somerset Maugham illustrates the difficulty of arriving at decisions when there is an almost equal balance between two strong incompatible goals. An ambitious and rising young diplomat fell in love with a girl of questionable reputation. Continuing his career meant giving up his sweetheart; marrying her meant giving up his career. He decided in favor of the career but regretted the decision for the rest of his life. Had he chosen the girl, he undoubtedly would have regretted similarly the lost career. Decisions are equally difficult and the results may be as unsatisfactory when each goal involves both satisfactory and unsatisfactory features. When it is impossible to get adequate information concerning each alternative or when unpredictable future events are involved which can be imagined but whose likelihood of occurrence cannot be estimated, the person is placed in a very trying dilemma. Although escape from the conflict situation by renouncing both goals seldom yields any satisfaction to the person, renunciation

of one goal often does. After the choice is made, the reality of the pleasurable aspects of the accepted goal outweighs the now shadowy satisfactions of the rejected goal. Choice between two attractive goals connected with needs that are not very strong is usually easy and seldom entails regrets.

Moral Conflict. Conflicts involving moral problems are of the same general nature as those already discussed, but they involve two additional factors. If the choice made is against the mores, a feeling of guilt and at least the possibility of social ostracism and/or punishment by the law become prominent considerations. For these reasons (if for no others) unethical choices seldom result in satisfaction for the person. It is possible, of course, for those who have undeveloped consciences and who are clever at concealing their behavior from other people to achieve satisfaction through such a choice. For most of us, if we are to get any satisfaction from such a choice, we must delude ourselves about the character of the act. For example, an advocate of political reform was confronted with a conflict between the need for recognition (ambition in this case) and his moral standards. He wanted to be nominated for governor but in order to do so, he had to make peace with the political boss of the state whom, as a reformer, he had been attacking. Before he was able to reach the decision to come to terms with the boss, he went through a long process of rationalizing⁵ until he had convinced himself that his motives were pure, that there was really no violation of his ethical standards.

A person tempted to commit an unethical act may consciously and purposely refrain until the opportunity for performing it has passed. If the contemplation of the act is very repugnant to him, he may force the idea out of his mind whenever it occurs to him.

Compromise Solutions. Sometimes analysis of a conflict situation shows that it is not necessary to accept one goal and renounce the other, but that a solution enabling the individual to achieve the essential features of both goals is possible. For example, the young man previously mentioned might have been

able to obtain a fellowship which would have allowed him both to become a father and to continue his studies. Although he would probably have to get along on a lower standard of living than he would have preferred, the tensions of both needs would have been definitely reduced. The adolescent referred to on page 627 may talk over his problems with his parents and come to an agreement with them which would allow him somewhat more independence but not more attendant responsibility than he could manage. College students who find a conflict between sectarian religious beliefs and the teachings of science may sometimes reach a compromise solution. They may retain the ethical beliefs of their sect while reinterpreting their religious beliefs in a manner consistent with the method and discoveries of science. It is impossible to judge how many conflicts are susceptible to compromise solutions. Whenever a conflict is faced by an individual, it is always desirable to examine the possibilities for a compromise as well as the consequence of a definite choice.

INDIRECT METHODS

Indirect methods include (1) sublimation, (2) withdrawal (including regression and daydreaming), (3) identification, (4) becoming dependent, (5) rationalization, (6) repression and its auxiliaries, projection and reversal formation, and (7) atonement. These methods, often called *mechanisms*, are distinguished from direct methods by the fact that they are typically unconscious (or dimly conscious) and by the fact that the main purpose they serve is to ameliorate immediate distress. While direct methods are typically employed to solve a particular adjustment problem once and for all, indirect methods may or may not serve to improve the long term adjustment. By the alleviation of unpleasant tension, the person may be enabled to avoid a feeling of defeat and thereby to retain the courage and energy necessary to grapple with life's difficult problems at a later time. On the other hand the indirect method of tension reduction may complicate the problem so as to make a long-term adjustment more difficult to achieve.

Indirect methods are primarily means for avoiding or reducing anxiety, pain, and distress brought about by thwarted needs or humiliations. In some instances they may serve to *prevent* an action which would result in distress, in others to *restore* the feeling of security or adequacy.

Unfortunately it is impossible to make a completely adequate exposition of these mechanisms. As Knight says, ". . . there is now an imposing body of literature having to do with the theory and clinical aspects of these mechanisms. There is, however, a regrettable inconsistency and lack of unanimity in the usage of these terms in the literature."⁶ Thus warned, the teacher will take a properly cautious attitude. He will recognize that since the experts do not always agree, he, the teacher, can hardly be competent to make an accurate diagnosis of the behavior of his friends or pupils in terms of adjustment mechanisms. However, the knowledge that many forms of annoying behavior may be indirect methods of tension reduction often enables the teacher to adopt a more sympathetic and more constructive method of treatment. Hence an examination of certain adjustment mechanisms becomes profitable.

SUBLIMATION

Sublimation As a Method of Discharging Tension. Sublimation, a concept originated by Freud, is the center of a great deal of controversy. Freud defined it as the unconscious deflection of libido into other more socially acceptable channels. (Libido is defined as "the energy . . . of those instincts which have to do with all that may be comprised under the word 'love'.")⁷ Since Freud also used the phrase "the sexual instinct" as synonymous with libido, much confusion has resulted. The process was widely held to be the solution of the adolescents' problem of controlling the sex urge before they were able to marry. For people in general, it was believed that art, scientific pursuits, and teaching all provided satisfactory sublimations of the sex drive. However, few authorities today believe that it is possible to achieve a permanent discharge of sexual tension through nonsexual activities.

Even Freud did not imply that sublimation would do this. He presented a much more moderate view of the efficacy of sublimation than many of the psychologists who have described the process. He said, for example: "Sublimation succeeds with the minority and with them only intermittently. The sexual instinct is characterized by special stubbornness." ⁸ Recent studies have verified this conclusion. Taylor,⁹ who investigated the sexual adjustment of forty unmarried men between the ages of twenty-one and thirty-eight, found that it was not possible for them to obviate through sublimation the necessity for some form of direct sexual expression. Kirkendall, on the basis of "hundreds of conversations with young men" concerning their sexual adjustment, states: "I have found not one individual who claims to have achieved this form of adjustment [sublimation]." ¹⁰

Sublimation as a Method of Reducing Tension. If we think of sublimation as the unconscious process by which a reduction of tension connected with the needs comprising "love" occurs, it appears that such reduction is possible. Heterosexual love can be conceived of as consisting of a fusion of the needs for sexual activity, "belonging," affection, and the desire to care and be cared for. Activities which satisfy the latter needs may afford, at least in some persons, a degree of tension reduction of the fused needs. Thus, nursing, child welfare and social work, teaching (especially of young children), religious activity (which frequently offers both an opportunity for the expression of reverence for God plus welfare work with people), friendships with persons of both sexes, and the care of pets are believed to afford some tension release. The effectiveness of these activities is probably greater after the period of life in which the sex urge is most imperious. When, in addition to engaging in such sublimatory activities, persons contrive to avoid situations which tend to arouse sexual desire and at the same time cultivate a wide variety of interests, their adjustment may be markedly improved. There are probably great individual differences, and perhaps sex differences, in the extent to which sublimatory activities are effective in improving adjustment.

WITHDRAWAL

The primary object of withdrawal is to remove oneself from a distressing situation. The process may take many different forms and may vary in extent and in degree of permanence. Examples of fairly complete and permanent withdrawal may be found in individuals who became forest rangers, lighthouse tenders, or who take up other more or less solitary occupations in order to isolate themselves from their fellows. Temporary but complete withdrawal is found in the behavior of Abraham Lincoln who, in an effort to escape from the impending marriage with a politically ambitious and neurotic woman, left town and disappeared into the hinterland for two years. Similar behavior but not so drastic is that of a person who locks himself in his room and refuses to see anyone for hours after a humiliating defeat.

Regression. A type of withdrawal that is of considerable importance is called regression. This is basically a method of responding to a baffling life-problem by a reversion to an earlier mode of reaction. Regression is found in its most extreme form in certain cases of schizophrenia (a common type of mental disease). Such patients have, in essence, retreated from the adult world into infancy, and are unable to wash, dress, feed themselves. Regression may appear in less extreme forms.

Examples of Regression. Chauncey's mother was very anxious to have a daughter but, unfortunately for her, gave birth to a son. She did her best, however, to make up for her disappointment by giving him an effeminate name and bringing him up as much like a girl as she could. She kept him with her at all possible times, and Chauncey came to take pleasure in household tasks and to take pride in being "mama's little helper." When Chauncey became an adolescent, he found that he was not attracted to girls as the other boys were. This resulted in a severe, painful, and continuous conflict which he tried to resolve in many ways. In the course of time he entered medical school in the hope that medical knowledge would aid him in solving his problem. His hopes were not fulfilled, and

as a last resort he went to New York to become an actor, thinking that in the Bohemian atmosphere of the stage he might feel more at ease. He had little success in obtaining roles, and finally went back to the small town of his birth to spend most of his time sitting around his mother's house.

A less severe form of regression is found in the case of Joan. Joan was a charming, well-behaved child of three years. She received a great deal of praise and attention from her parents and visitors to the home. Shortly after the birth of her brother, she reverted to wetting and soiling her bed and clothes.

Evaluation of Regression as a Method of Adjustment. Regression serves the individual by permitting him either to escape from the necessity of having to solve baffling life-problems or to attempt their solution by means which were appropriate at an earlier stage of development. Joan, for example, suffering from lack of attention, reverted to a form of infantile behavior by which she expected to regain her accustomed amount of care and attention. Chauncey, however, had given up the struggle to solve his problems. He had essentially reverted to the stage of being "mama's little helper" and again placed himself under maternal protection.

In general it may be said that any form of behavior in daily life which constitutes an attempt to solve a difficult adjustment problem in an immature manner is essentially regressive. In an adult the return to the oversimplified religious beliefs of early childhood, the use of temper tantrums, lying to impress others—all may be considered regressive in character.

The effect of regression upon personality growth and mental health depends upon a number of considerations. If it is used as a means of solving difficult adjustment problems, it may provide tension reduction at the expense of more important values. When it is used as an escape from frustration, it has positive value only when it is of short duration. If it is rather permanent as in the case of Chauncey, who regressed to a childhood level, sacrificed the satisfactions that accompany mature efficiency and the utilization of his intelligence for a

kind of placid routine, it is harmful. But individuals who occasionally indulge in childish horseplay or who retire for a while to a protected environment may suffer no harm from their temporary retreat and may even gain some strength to continue the battle with their problems.

Daydreaming.¹¹ Daydreaming is the process of thinking or imagining through which unfulfilled wishes are gratified and blocked goals attained directly or indirectly. Three illustrations will be given.

Frances, a high school girl, went to a type of dance, under the auspices of the school, to which both boys and girls bought tickets separately. Thus she had no escort to dance with, and being rather unattractive, was not asked to dance during the whole time she was there. As she walked home, she became in fantasy the most popular and beautiful girl in the school. She had all the most attractive boys thronging around her and demanding dances. She invented their actual words and her replies to them.

James Thurber, noted for his humorous contributions to *The New Yorker* magazine, relates the following instance.

I had been travelling about the country attending dog shows. I was writing a series of pieces on these shows. Not being in the habit of carrying press cards, I had nothing by which to identify myself. I simply paid my way in, but at a certain dog show I determined to see if the officials in charge would give me a pass. I approached a large, heavy set man who looked somewhat like Victor McLaglen. His name was Bustard. Mr. Bustard. "You'll have to see Mr. Bustard," a ticket-taker told me. This Mr. Bustard was apparently very busy. . . . He glanced at me, saw that he outweighed me some sixty pounds, and decided to make short shrift of whatever it was I wanted. I explained I was writing an article about the show and would like a pass to get in. "Why, that's impossible," he cried. "That's ridiculous! If I give you a pass, I'd have to give a pass to everyone who came up and asked me for a pass!" I was pretty much overwhelmed. I couldn't, as is usual in these cases, think of anything to say except "I see." Mr. Bustard delivered a brief, snarling lecture on the subject of people who expect to get into dog shows free, unless they are showing dogs, and ended with "Are you showing

dogs?" "No, I am not showing any dogs," I said coldly. Mr. Bustard abruptly turned his back to me and walked away.

As soon as Mr. Bustard disappeared, I began to think of things I should have said. . . . Finely edged comebacks leaped to mind. . . . I fancied a much more successful encounter with Mr. Bustard. In this fancied encounter, I, in fact, enraged Mr. Bustard. He lunged at me, whereupon, side-stepping agilely, I led with my left and floored him with a beautiful right to the jaw. "Try that one!" I cried aloud. "Mercy!" murmured an old lady who was passing me at the moment. I began to walk more rapidly; my heart took a definite lift. Some people, in my dream, were bending over Bustard, who was out cold. "Better take him home and let the other bustards pick his bones," I said. When I got back to the dog show I was in high fettle. . . .¹²

Smith was a salesman who had made an outstanding record. The salesmanship was open at the time, and Smith fully expected to be promoted to it. Instead, a salesman whom Smith considered in every way his inferior was given the coveted post. Smith was terribly disappointed. While sitting in his office the afternoon of the day the announcement was made, he had the following daydream. He was as tall as a twelve-story building and walked through the streets of the city evoking terror in the passers-by. Occasionally he would reach down and pick up an automobile and throw it to the ground. Again he would push over a near-by office building. He continued his destructive course until the streets were empty (and he, incidentally, felt better).

Daydreaming as a method of adjustment. Daydreams allow a person to achieve in fancy what he cannot achieve in reality. Frances wanted to be attractive and popular. She was, in her daydream. Thurber wanted to humiliate Bustard as he had been humiliated. He did in fantasy. Smith's frustration aroused strong feelings of aggression which he could not express directly. He expressed them in fantasy.

One may note certain differences in these daydreams. Frances in fantasy reaches her goal directly. Thurber does not fantasy reaching his original goal (that is, getting into the dog

show free) because his desire for revenge overshadows it; thus he vents his hostile feeling against his tormenter. Smith, however, does not even fantasy revenge against the new appointee or those who appointed him, but instead substitutes people-in-general as the object of his wrath. In all these instances, however, the daydreams yielded a temporary satisfaction to the dreamers.

Daydreaming can be distinguished, on the one hand, from revery, which refers to indulgence in an aimless train of ideas, and on the other from logical, realistic, directed thinking. The distinction is, however, far from clear-cut. Revery may merge into daydreaming and daydreaming into realistic thinking. Revery is more of a reaction to boredom, or monotony, or lack of interest, while daydreaming is more likely to be connected with specific frustrations.

Daydreams common among children. Types of daydreams common among children are the conquering hero, the suffering hero, and the foster child. In the conquering-hero form, the child may picture himself as a hero in battle, on the gridiron, in the prize ring; as a great singer or preacher; as the strongest, most admired—indeed, as the superlative in any line, even in benevolence or modesty. In the suffering-hero form, the fancies may run something like this: A boy, ruminating over his hard luck and ill treatment (as he sees them) at home, pictures himself as forced to run away. He imagines himself joining a group of bandits and going to the bad completely, or perhaps overwhelmed by a snowstorm or wild beasts, by which he is seriously injured. Meanwhile, parents, teacher, some little girl, in fact the whole village has become alarmed and repentant, and after vigilant search, he is brought back a hero, even if a wounded one. In the foster-child fantasy, the child, because of frustrations by his parents, imagines that he is not their son or daughter, but that he is really the child of important, wealthy, or prominent people. He has been adopted in infancy. This fantasy not only yields a flattering enhancement of his self-esteem but enables him to account for the “abuse” at the hands

of his "foster-parents." They would naturally show some resentment over a child whose endowment is superior to theirs.

Evaluation of daydreaming. Daydreaming as a device for temporary or partial wish fulfillment has both positive and negative aspects. In addition to the positive values mentioned in Chapter VI, daydreaming may aid in restoring self-confidence (as in the instance cited by Thurber), or it may lead to the formulation of a worth-while goal of conduct. On the other hand, through habitual use in all frustrating circumstances, it may lead to a withdrawal from the real world. The adult, however, may use his daydreams to learn about his unconscious or dimly conscious wishes. The discovery that he is frequently daydreaming about the same topics may reveal to him what needs in his life are not fulfilled, and it may then be possible for him to take steps toward gratifying them in reality.

Other Forms of Partial Withdrawal. *Avoidance or limitation of the situation* is a form of partial withdrawal. Some individuals stay away from situations in which they have met defeat or place limits upon participation therein. A youth who has been humiliated at a dance may avoid dances altogether or he may go to them but confine his activities to watching from the sidelines. The individual who has failed in a position of leadership may avoid situations in which he has anything but minor responsibility. A similar device is to *restrain emotional involvement*. One young man had had the unfortunate experience of falling in love with one girl and later with another, only to be rejected by each one in favor of more attractive rivals. In subsequent relationships with girls, he made it his practice never to go "steady" with one girl, refusing to allow a girl to "break a date" for him, and mentioning to each girl he went out with more than once that he had no intention of settling down. He was afraid not only that they would become too fond of him, but that he would fall in love with one of them and thus again be in a position where rejection would cause him to suffer as he had previously.

If the individual cannot avoid or limit the situation, he

may be able to *postpone having to meet it* or *procrastinate*. Thus he gets temporary relief from distress even if it means a greater amount at a later time. Procrastination is fairly common among those with perfectionistic tendencies which are rooted in inferiority feelings. They have a strong tendency to avoid a test of strength because they are hypersensitive to failure, and failure is practically assured for those who set their level of aspiration inordinately high. One young man who was especially sensitive to failure wanted to get a scholarship in a certain university, but was dimly aware of a fear that he would not be granted it. The result was that he sent in his application when the time limit had just expired. This action made obtaining the scholarship unlikely, but he had provided himself with an excuse for not being awarded it. The well-known delay in getting in college term papers on the date due or at least postponing work on them until the last minute may be similarly motivated. A temporary peace of mind is attained through delay, and the individual can assure himself that an unsatisfactory mark was due to the haste in which he was forced to write.

Another common method of partial withdrawal is to *plunge into a number of activities* in order to become so fully occupied with other things that there is little time to think about a distressing frustration. Women whose dearly loved husbands have died are prone to use this device. Some return to college or university to refurbish themselves professionally, and, driven by their need to escape unwelcome thoughts, undertake so much work that they find themselves unable to meet the course requirements. The businessman who is having marital difficulty may spend long hours at the office and take on additional responsibilities in order to reduce his mental distress. A similar device is to plunge into diversions—movies, plays, night clubs, cards—in the hope of barring unwanted thoughts through absorption in these activities.

Becoming sleepy or drowsy is a well-known method of temporary escape from unwelcome tasks. Many parents have commented on the difficulty their children have in staying awake long enough to finish their homework. One parent became able

to tell when her boy had done something he thought was "bad" through noticing that regardless of the time of day he would always go to sleep after such occurrences.

Alcohol for many and *drugs* for a few provide a means of escape or temporary withdrawal. Indulgence in alcohol not only makes it easy to forget the frustrations of the day but typically produces a mild euphoria. The effects of short-term overindulgence (the hangover) and of long-term overindulgence (delirium tremens) are well known. Certain drugs (opium, marihuana) are said to produce not only an amnesia but also pleasurable hallucinations. The baneful effects of these drugs are also well known.

Whether the forms of partial withdrawal discussed (with the exception of the use of drugs for all people and the use of alcohol for some) aid or retard permanent adjustment depends primarily upon the extent to which they are used. The tension reduction afforded by avoidance or limitation of the situation, restraining emotional involvement, procrastination, plunging into activities or diversions, and perhaps even becoming sleepy, may have a beneficial effect if such devices are not employed too frequently. Only when their use becomes habitual or when they are substituted for more adequate means of overcoming frustration need one be concerned with possible harmful consequences. It is unfortunate that so many people believe *temporary* escape or withdrawal to be incompatible with their self-esteem. If one must "face the music" all the time, one's ears are likely to suffer.

IDENTIFICATION

Identification may be defined as a process by which the individual allies himself emotionally, or feels himself one with, another person or group.¹³ It should be noted that identification is the major process by which we attempt to understand another person; it is employed whenever we read a novel or see a movie. Here we are dealing only with its use in response to thwarting or to rebuff.

Through identification an individual may, because of a felt

lack, (1) seek to improve his personality by modeling his behavior after a person he admires, (2) seek vicarious satisfaction of blocked impulses, or (3) relieve his feeling of inferiority by increasing his feeling of worth or importance.

In the process of growing up, many children sense lacks in their own personalities. These are made evident to them from thwartings and the discoveries of their powerlessness in many situations. Consequently, a child is likely to copy, without full awareness of the process, the attributes of a person, usually those of an older child or an adult, who has characteristics which he himself desires. It is very common for a girl to identify herself with her mother and for a boy to identify himself with his father. In this way, the child feels a certain protection in acting the way the admired, powerful person acts. Such identification is very similar to hero worship.

Vicarious Experiences through Identification. Vicarious satisfaction of impulses is typically obtained through identification with characters in novels, movies, or plays. Through this process adventures may be had, desires for power gratified, and impulses that are socially disapproved may, in a way, emerge into action. In the Bellevue Hospital ward for behavior problems, a puppet show is enacted frequently. One of the characters, the monkey, is completely uninhibited and is continually violating custom and convention. The children's delight in the antics of this character in all probability stems from their identification with the monkey and their opportunity to carry out, vicariously, antisocial acts through him. Such identifications are of short duration, vanishing in most instances when the novel is finished, or when the movie or the play is ended. Under some circumstances, however, identification for vicarious satisfaction may be of longer duration. For instance, a mother may, because of the lack of emotional outlets in her present life or because of the thwarted nature of her own childhood, metaphorically *live through her child*, experiencing his joys, sorrows, and desires as if they were her own. It is, of course, quite normal for mothers to participate vicariously in the lives of their children. It is only when the child, through

identification, becomes the main outlet for emotional experience that there may be unfortunate results.

Self-Esteem Bolstered through Identification. Many times identification serves the purpose of alleviating a feeling of inferiority by increasing a person's feeling of worth or importance. In England it is supposedly quite common for a servant of a noble lord to identify himself with his master and assume a haughty air with tradesmen who come to the house. An identification with a school, club, or nation may serve the same end because it permits indirect praise of the individual through praise of the group to which he belongs.

Identification with a powerful person will tend to increase at least temporarily the feeling of power of the individual. Further effects upon the personality depend upon the model selected. If the person imitated has admirable character traits, the effect is wholesome. Such a person may favorably influence the ideals as well as the behavior of the individual. On the other hand, if the model is, say, a gangster, the identification may serve to strengthen tendencies toward antisocial behavior. Identification for the purpose of vicarious satisfaction of impulses may make life less drab, or afford a harmless safety value for socially disapproved desires. Even so, when the individual identifies to increase his feeling of worth, the value depends upon the results. If it alleviates a painful feeling of inferiority, it may serve a useful function, but if it results in socially obnoxious behavior (*e.g.*, inordinate boasting about "our" school) its effects are undesirable.

BECOMING DEPENDENT

Becoming dependent upon another is a device utilized when a series of thwartings have resulted in the individual's losing confidence in himself. When this occurs he may attach himself to a supposedly stronger and wiser person from whom he seeks advice at frequent intervals and who becomes for him the bearer of the responsibility for his own actions. Some individuals, instead of relying on one person, become submissive to all their associates, and busy themselves in trying to anticipate

their wishes and carrying out their requests in the vague hope that they in turn will be aided in attaining their own goals. As can easily be inferred, however, such a solution of one's problems entails too great a sacrifice.

The use of a confidant, a trusted friend, or counselor to whom adjustment problems as well as private feelings can be confided, should be sharply distinguished from becoming dependent or submissive. If a person is fortunate enough to have a friend with whom he can lower his defenses and who is able to maintain the necessary objective-sympathetic attitude (described in Chapter XXI), a great deal of relief can usually be obtained. Not only is there a release of tension but often a helpful clarification of the problem through joint effort.

RATIONALIZATION

Rationalizing is the process of devising more or less plausible but inadequate reasons to account for or justify an opinion, feeling, action, or situation, when the individual would find the true explanation unacceptable. It is expected, in our culture, that each person understand the bases for his actions, and act rationally and in consonance with standards of achievement, morality, and conventional behavior at all times. The individual feels humiliated when others call into question what he does, says, or feels, or suggest that the situation in which he finds himself is degrading. Or he may have qualms about his own behavior. In either case, he may reduce the unpleasant tension by rationalizing. Rationalizing is most commonly found after failure to achieve a goal.

Individual's Awareness of His Rationalizing. Of what aspects of the situation is he aware and unaware during or just preceding rationalizing? He is aware of the threat to his self-esteem, else there would be no call for justification. He is unaware, however, or, at most, dimly aware, of the true reasons for his behavior and of the fact that he is rationalizing. Although it is taken from the somewhat uncommon situation just following hypnosis, this example by Morgan illustrates these points:

While in the hypnotic sleep the subject can be told that after he wakes, he will do a certain thing. . . . For example, one subject, while in hypnosis [during a classroom demonstration] was told that when he was awakened . . . he would move to the chair which was in front of him. After being awakened he did as he had been told. . . . When asked why he had changed his seat, he replied, "I thought you were through and so that was the natural thing to do." As a matter of fact, the natural thing would have been for him to take his regular seat and not the one he had been told [in hypnotic sleep] to take.¹⁴

Thus he manufactured a reason for his behavior. One will note from this example that (1) the subject was unaware of the reason for changing his seat, (2) he was aware of the threat to his self-esteem (the irrationality of taking the wrong seat), but (3) he was not aware that he was rationalizing.

The Difference between Rationalizing and Lying. To illustrate the difference between rationalizing and lying, let us consider the following hypothetical instance. A child is late to school because he stopped on his way to watch workmen excavating the foundation for a building. When asked by the teacher his reason for being late, he says that his mother's sudden illness caused a delay of his breakfast which made it impossible for him to get to school on time. Let us suppose that the child's mother actually was sick and that breakfast was delayed (not delayed enough, however, to prevent the child's getting to school on time by walking briskly). The child's excuse, one can see, is similar to a rationalization. The child gave a plausible reason for his lateness. Actually, however, the child was aware of the true reason for his lateness and aware that he was not telling the truth. Thus his excuse was not a rationalization but a lie. The child was trying to deceive others but was not deceiving himself. Thoroughgoing rationalization always involves self-deception; the deception of others may or may not be involved.

It is not always easy, however, for a person to be sure whether he himself is rationalizing or lying, as the following instance will show. A chemistry instructor is asked out to din-

ner by an acquaintance for whom he has feelings vacillating between indifference and mild dislike. Since the circumstances are such that to refuse the invitation would hurt his acquaintance's feelings, he accepts. Late in the afternoon just preceding the dinner, one of the students in the chemistry laboratory causes an explosion in which he is seriously injured. The instructor gives him first aid as best he can and goes with him to the hospital. In his concern, he stays there for some time—so long, in fact, that the dinner hour comes and goes. He, of course, has forgotten about his engagement. When he sees the acquaintance the next day, he suddenly remembers the forgotten dinner and explains that the accident prevented his keeping his engagement. Later he asks himself whether he has given the true reason for his behavior. He recognizes the fact that he really did not want to go to the dinner, that his presence in the hospital the previous evening was not helping the unfortunate student, but that, on the other hand, he had every intention of keeping the engagement until the accident occurred. He asks himself whether the accident and his subsequent conduct would have driven from his mind the thought of a dinner to which he wanted to go. He is unable to decide. It would probably be difficult for anyone in similar circumstances to be certain.

Criteria for the Detection of Rationalizing in Others.

There are some criteria, however, that help one to detect in others many instances of rationalization. The first is, obviously, the plausibility of the explanation itself. Intimate knowledge of the individual helps one in determining whether or not the reasons given are consistent with his usual behavior. Second, hesitation on the part of the suspected rationalizer before bringing forth his excuse is a possible sign, though this is likely to be characteristic of inexperienced lying also. Third, vehemence in the manner of speaking while giving the explanation and undue warmth in defending it when challenged may betray a rationalization. None of these criteria is completely dependable, however, and it is usually inadvisable to accuse a person

of rationalizing. Whether or not the charge is true, he will probably be angered. Usually the process of rationalization is employed "after the event," but upon occasion an individual may attempt, by marshaling all the "good" reasons he can, to convince himself that a contemplated act is the thing he really ought to do.

The forms of rationalization are legion. We will mention but two here. In one, the "sour grapes" form, the individual explains shortcomings through minimizing or denying the desirability of the goal he was unable to reach. Failing to be accepted by the girl he desires to marry, he may call attention to the foolish risks people take in getting married. Having failed to win a fellowship, he may assert that the duties required would have been too onerous for him anyway. The other is called the "sweet lemon" form (like the fox who could find none but sour grapes and declared they were really sweet—just the kind for which he had been searching). In this form, instead of minimizing the desirability of the goal, he magnifies the desirability of his present situation.

Prejudice and Logic-Tight Compartments. Systems of ideas composed of rationalizations of various types, beliefs, superstitions, prejudices, grudges, or habits developed in the course of the years often become so firmly established that they can scarcely be dislodged even in the face of substantial evidence that they are irrational, useless, or even vicious. Such acquired systems of response, impenetrable to logical attack, have been called logic-tight compartments. Among the milder forms of logic-tight compartments are the individual's conviction of the superiority of his town, his college, or himself. In various ways a person may "close his mind" to the arguments that run counter to his wants and cherish those which favor them. In the course of time, these prejudices become fixed. Through the use of logic-tight compartments, he also can keep inconsistent beliefs separate and thus escape conflict.

Evaluation of Rationalizing. Rationalization is not devoid of real value to the individual. Allport asks:

Why should an intelligent person invent an eyewash [that is, a rationalization] for himself? Because an eyewash, surface treatment though it is, brings immediate relief, preventing conflicts from developing through the sense of being in the wrong, and engendering a certain bravado necessary for life, and for maintaining one's rights in the face of immediate opposition. Self-deception also enables one for the time being to put off the admission of unpleasant truths until one is ready to receive them.¹⁵

Incidentally, it acts as a countering tendency to the strong belief in this culture that each man is solely responsible for all his failures and frustrations. On the negative side, it is easy to see that frequent use of rationalizing interferes with valid solutions of real problems, and, in the form of logic-tight compartments, may keep prejudices and superstitions firmly reinforced. It is important for parents, teachers, and students of education to remember that insisting on an explanation for every instance of a child's misbehavior practically forces a rationalization. The child on many occasions simply does not understand why he acts the way he does. In dealing with his own tendencies to rationalize it is of value to the student of education to understand that if he questions on occasion his own explanation (as the chemistry instructor did), it is in itself an indication that self-deception is not unduly entrenched in his personality.

REPRESSION, PROJECTION, AND REVERSAL FORMATION¹⁶

The terms "repression," "projection," and "reversal formation" have been widely used to describe certain methods of tension reduction which may be employed in normal living but which, in extreme forms, are characteristic of quite abnormal behavior. Repression is said to occur when an impulse is excluded from consciousness. A not uncommon example of repression at its mildest could be the forgotten dental appointment. When repression occurs as a reaction to a conflict between a basic need of the person and his moral standards then various complications may follow. The individual might employ projection, which is essentially the attributing of his own impulses or behavior tendencies to someone else. He might

even develop reversal formation, which is said to occur when an individual counters his own underlying impulses so effectively that the opposite tendency appears in his observable behavior. Our most spectacular examples of these methods of tension reduction come from case studies of severely maladjusted individuals. Repression, projection, and reversal formation are employed most often to deal with strong conflicts which involve the self-esteem or moral standards of the individual. The teacher should recognize, however, that in occasional, mild form these methods of tension reduction can mark the course of normal adjustment for both children and adults.

Repression. In dealing with this topic, our analysis will follow that made by V. F. Fisher.¹⁷ Repression may be defined as the unconscious process by which impulses or ideas which would be painful if the person were aware of them are excluded from consciousness and direct motor expression. Repression must be distinguished from *inhibition*. Both repression and inhibition involve the prevention of impulses from issuing into action, but there are important differences. In inhibition the impulse is consciously felt and consciously prevented from issuing into action. When a similar occasion arises subsequently it will be felt consciously again. In short, inhibition is a way of handling impulses for the moment.

In repression, the individual is not fully aware of the impulse or of his attempt to restrain it from issuing into action. During a similar occasion subsequently he will again be unaware, or, at the most, only dimly conscious, of the impulse. Inhibition is likely to occur where the antagonistic impulse is not very strong and when it is not especially incompatible with the self-esteem and moral standards of the individual. Being a conscious process, the individual has a certain amount of control over the manner of expression of the inhibited impulse, but he has little control over the expression of a repressed urge.

Relation of repression to neurotic symptoms. It is sometimes said that repression always results in neurotic symptoms. This, however, would appear to be true only when a strong basic urge is completely repressed. When this happens neurotic

symptoms are likely, but even then not sure to follow. Let us consider, first, what happens when repression is not complete; when a basic urge (the sex urge, for example) is incompletely repressed. The urge is likely to be expressed in modified forms which are not necessarily neurotic symptoms. For example, the excessive interest which some individuals develop in births, marriages, and divorces has been interpreted as an indirect form of expression of a partially repressed sex urge. The "woman-hater" may be using reversal formation as a method auxiliary to repression, and through this means achieve a modified form of expression. Second, let us consider the repression, not of an urge, but of a certain desire connected with the urge (that is, one of the possible goals). For example, a man finds himself becoming very fond of his brother's wife. Before the sexual feeling becomes fully conscious, he may repress it. In this, and similar situations, nothing in particular may result from the repression. The sex urge, itself, can be expressed in other directions. Let us assume even further that a man represses his heterosexual desires; when this happens, other forms of expression such as masturbation or erotic daydreaming may be substituted.

Evaluation of repression. By repression the individual may avoid painful conflict and maintain his behavior on a level which will be morally, ethically, or socially approved. If he turns to projection or reversal formation, the consequences will depend on the particular forms they take. The disadvantages are two: first, that the individual's problem may not really be solved and that a partial solution may discourage him from seeking a satisfactory final solution (assuming that one is possible); second, that the methods of projection or reversal formation may result in adverse personal or social reactions which make adequate adjustment in terms of normal life goals even less likely.

Projection. Projection may be defined as ascribing to others (1) unacceptable impulses, thoughts, feelings, and wishes arising in oneself and (2) the responsibilities for such actions which

one wishes to disclaim. An illustration is taken from Menninger.

Walter and Helen had been "going together" since their sophomore year. Things had become fairly settled. Neither one was much interested in anyone else. During the summer vacation they were widely separated. . . . They corresponded regularly and renewed all the old vows and protestations. Apparently the summer was uneventful and they both returned to college and to each other in the fall quite unchanged.

But upon the occasion of their first "date" there was a grand row. In thinking it over afterwards neither could exactly explain it. Helen seemed determined to find some fault in Walter; she appeared to have a chip on her shoulder which she was glad to have him knock off. When he did, the storm broke. . . . [Her] chief allegation seemed to be that he no longer showed any evidence of love for her, and the only explanation of it was that he had become embroiled with some girl . . . [during the vacation] and had forgotten his loyalty to Helen.¹⁸

The facts in the case were that Helen had had flirtatious desires which were in conflict with her moral standards and her feelings of loyalty to Walter. She partially repressed them and then as a further measure of protection, projected these desires (and actions leading from them) to Walter. We need not assume that these desires were ever fully conscious to Helen, and of course neither were the processes of repression and projection.

An experimental study of projection. In an experimental study of projection made by Sears,¹⁹ fraternity brothers rated themselves and others on the traits of obstinacy, orderliness, bashfulness, and stinginess. To avoid unnecessary detail, we shall consider only the results for the last trait. One of the questions with which the experimenter was concerned was: Will persons who are most stingy (as determined by the ratings of others) tend to project their stinginess into others (that is, rate others on the average higher in stinginess) more than those who are less stingy? He found that there was no such tendency.

Another question investigated was: Will persons who are stingy but who do not recognize the trait in themselves (that is, lack insight) project their stinginess into others more than those who are equally stingy but who have insight? He found an affirmative answer to this question. Those who lacked insight into their own stinginess rated others higher in stinginess than did the stingy individuals who had insight. Sears also found that the generous individuals who lacked insight were more inclined to attribute generosity to others than were equally generous ones who recognized their own generosity. This study suggests that, if an individual has insight into his own characteristics as compared with his fellows, he is less likely to fall into "errors" of projection. Of even greater general importance is the finding that both "good" and "bad" traits are projected in a similar manner. Since the finding is open to a number of different interpretations, however, and since there is no confirmatory evidence as yet, suspended judgment is necessary.

Common forms of projection. A common form of projection is for an individual to ascribe the blame for his own deficiencies or failure to other people or to inanimate objects. "The woman tempted me" is an age-old projection. If while groping our way across a dark room we thump our shin on a footstool (owing to our own forgetfulness), our immediate impulse and not infrequent act is to reproach the stool rather than ourselves. Missing a stroke in tennis, we look inquiringly at the racket, ball, or net. The clumsy carpenter accuses his tools. If we fail an examination, the questions were unfair. If one is a slave to alcohol, the taste was inherited from one's father.

Projection allows the individual to achieve a superficial peace of mind, and if the mechanism is not used very much and does not lead to action on the basis of the projection, there is little harm in it. If, however, it becomes a fixed habit and action is based on it, it may do serious harm. Projection of blame that should be properly ascribed to oneself could be considered a form of rationalization, but a better formulation would be rationalization through the medium of projection.

Projection does, of course, afford a relief from painful conflict. It makes it unnecessary for an individual to face his deficiencies, but if the process becomes habitual, it is likely to interfere with social adjustment.

Reversal Formation. Reversal formation is the process of developing in the personality conscious attitudes and interests which are the opposite of certain partially repressed wishes or trends. Its function is to aid repression in avoiding conflict.

Examples of reversal formation. A mother brought her three-year-old daughter to a medical clinic with the complaint that the child was ill. She could not give any account of specific symptoms but said the child was "not strong," "not robust," and seemed to pick up colds easily. When the child was examined, she was found to be in perfect health but appeared somewhat tense and afraid. In the course of conversation, it was found that the mother showed extreme anxiety concerning the child's welfare, bathed her and changed her clothes three times a day, would never let her play with other children for fear of contagion, and even when she played in the house made sure that the playroom and toys were perfectly clean. Sometime later it was found that the mother had not wanted to have a baby at all—it had meant giving up a position in which she had obtained a great deal of satisfaction. Only because she loved her husband very much had she gratified his strong desire for a child. Now she noticed that her husband spent a great amount of time and attention on his daughter, and she was afraid that his love for herself had cooled. The unconscious solution of her problems—a return to the very gratifying life she had had previously—meant the removal of the baby. She did not recognize at the time that she hated the child, however; that feeling had been repressed, and her excessive anxiety and overprotection was the reversal formation to prevent the wish for the child's death from coming to consciousness.

Whenever one finds a socially approved trait carried to an extreme (*e.g.*, scrupulous honesty, prudery, excessive concern for others), one may suspect immediately the existence of an opposite partially repressed trait. From the standpoint of the

best adjustment of the individual, reversal formations appear to be of value if not exaggerated, harmful if excessive. Only when they are extreme is psychotherapy indicated.

Many cases involving paranoia illustrate repression, projection, and reversal formation. Hart gives the following as a typical case.

. . . an unmarried lady of considerable age and of blameless reputation begins to complain of the undesirable attentions to which she is subjected by some male acquaintance. She explains that the man is obviously anxious to marry her, and persistently follows her about. Finally certain trifling incidents lead her to believe that he is scheming to abduct her by force, and on the strength of this she . . . lodges a complaint with the police. Investigation follows, and it is found that the man is not only entirely innocent of the charges levelled against him, but that he has never expressed the least interest in the lady, and is . . . hardly aware of her existence.²⁰

In this case, the "unmarried lady" first tried to deal with her sex urge by forcing it from consciousness and motor expression (repression); that not being sufficient, she became a prude (reversal formation), and still not being able to succeed in handling the urge accused a young man of "scheming to abduct her" (projection).

EXPIATION AND ATONEMENT

Thus far we have dealt almost entirely with actions and conflicts dealing with present or contemplated behavior. The situation is somewhat altered when the behavior over which an individual is in conflict has occurred in the past. Rationalization is, of course, a common way of dealing with such situations, but at times self-deception may not succeed, nor is repression always successful. When other means fail to alleviate painful conflict over an act which is repugnant to the conscience, the individual may endeavor to find a way of atoning for it. The difficulty involved in many forms of restitution, however, is that the individual is subjected to social disapproval. Thus he seeks a way of solving the conflict without running this risk.

One graduate student (from a foreign culture) with a very deep feeling of inferiority felt so guilty for neglecting to study as hard as he thought he should have during the previous semester that, as a penance, he fasted for a week. Others try to balance "bad" deeds with "good" deeds they would not naturally have performed in order to assuage the pangs of conscience. Still others respond to any misfortune which comes their way with submission, believing that they are merely getting their just deserts. The value of atonement comes from the fact that it does offer a partial solution to the very difficult problem of how to reduce the tension due to conflict over past misdeeds. To what extent it is effective, however, is impossible to say.

COMPENSATORY METHODS

Compensation differs from any of the previous mechanisms discussed in that it covers an inexhaustible number of acts and can be defined only in terms of its aim. It covers all attempts to alleviate a feeling of inferiority. Thus rationalization, projection, in fact almost all the indirect methods previously discussed, may be compensatory at times. Whenever a thwarting is interpreted by an individual as due to his own personal defect or limitation and action follows which tends to restore his self-esteem, that action may be called compensatory. The development of substitute goals may be one form of compensation. But a substitute goal, to be considered compensatory, must be developed *because of* the unpleasant feeling of inferiority resulting from failure to attain the original goal. A common form of compensation is the *development of a potential strength*. The boy blocked in attaining recognition through scholastic success turns to athletics, extracurricular activities, social affairs, card-playing, hobbies, or any other activity in which he thinks he has a better possibility for increasing his self-esteem and winning social approval than in the original activity. The puny boy, unable to maintain his self-esteem through physical prowess, shifts his goal to excelling in his studies.

Many compensatory goals seem to be less the development of a strength than a "*covering up*" of weakness. Among these are found domination of others. By entering only into activities in which he can play the dominant role, the individual, at one and the same time, directs events away from his areas of weakness and also enhances his self-esteem through bossing others. *Boasting* is another compensatory device used typically by children who strive to convince others of their superiority by magnifying their own exploits. *Assuming an attitude of superiority* is a very subtle device by which the individual implies through the manner of his behavior rather than through what he accomplished that he is a superior person.

Showing off and *clowning* are attention-getting devices for concealing inferiority that are so easily recognized, especially among children, that comment is unnecessary. A response somewhat more typical of adulthood is the use of *humor* as a covering device. The individual, by treating awkward situations lightly or by making humorous remarks about a thwarting situation, may cover up his distress and even win favorable comments from his friends for being a "good sport."

The value of compensation in the adjustment of the individual depends not only upon its efficacy as a tension reducer but upon the social consequences of the activity. In general, the utilization of socially approved substitute goals aids in the permanent adjustment of the individual, while such practices as domination, boasting, and showing off are likely to result in poor relations with associates.

AGGRESSION AS A METHOD OF TENSION REDUCTION

In Chapter V it was pointed out that acts appearing to be similarly aggressive may spring from quite a variety of different motives and to serve different functions. A young child who is intent on getting possession of a toy another child has, may, if he encounters resistance, hit the other child. Is this an act of aggression? In a broad sense it is. It is very similar to acts of "unprovoked aggression" in warfare. We are concerned here,

however, with aggression in a narrower sense, as "an act whose goal-response is injury to an organism or organism-surrogate [*i.e.*, substitute]." ²¹ In this sense, the child cited above did not engage in an act of aggression if we assume that hitting the other child was merely a means to obtaining the cherished toy.

Aggression Not an Inborn Drive. Aggression has been said to spring only from frustration, but as previously pointed out it may also arise from having been humiliated. A theory formerly rather widely held was that aggression was an instinct or an inborn drive—or in our terminology, a need—which was touched off by the environment just as the need for food in the latent stage can be touched off, for instance, by the smell of freshly baked bread. Other theorists went so far as to compare it completely with hunger, *i.e.*, that it drove toward expression regardless of environmental events. Thus war could never be abolished because of the aggressive drive. Today after a deal of research and analysis, it is generally held that, while frustration or humiliation often lead to aggression, the constitutional basis exists only in the sense that persons are so constructed that a need for aggressive action may be evoked in them.

Aggression, of course, is not an invariant consequence of frustration or of humiliation, but it appears to be a relatively frequent one. Aggression as a method of tension reduction does not fall into the classification of direct and indirect methods because it may be either. It differs also in that the aggressive behavior (except in relatively unusual circumstances) merely satisfies the need for aggression or retaliation. It does not ordinarily reduce the tension of the original thwarted need.

Aggression May Follow Frustration. We cite a typical example. A child wants to go outdoors and play but is prevented from doing so by his mother. He responds by becoming angry and striking her. A precise analysis of this little episode reveals several features.

1. The child has an urge to go out to play. Play is his present goal.
2. His mother frustrates him by preventing him from achieving his goal (to play outdoors). This has the effect of producing in the

child an immediate impulse to aggression, in this instance to strike his mother.

3. Now the child has two tensions, that of the need to play outdoors and that of the need for aggression. The goal which would satisfy his first need has been blocked by his mother, but the second goal, that is, to express his aggression by striking his mother, is not blocked.

4. Consequently, the child responds by striking his mother, and thereby achieves the goal of his urge to aggression.

5. Presumably this direct aggressive action satisfies the need for aggression and has the effect of discharging all tension connected with this secondary urge.

6. The child, however, still has in full force his need (and the tension which accompanied it) to go out and play, which was originally thwarted by his mother. In short, striking his mother does not solve his original problem.

In this illustration, we must assume that the child could count on the mother's not engaging in counter-aggression or else he probably would not have taken a chance on hitting her. We must also assume that he did not believe that venting his hostility would result in her permitting him to play. If that were the case, the act of striking his mother would be one goal and would also serve as a means of achieving his original goal.

In some instances, however, the same act may have both characters. For example, the boy mentioned previously who was kept out of a playground by another boy could through physical assault not only meet his aggressive need but also clear the path to his original goal. Similarly, when a fly buzzes around us when we are trying to study, killing it meets the aggressive need evoked by the fly and permits us to return to our original pursuit.

Aggression and Self-Esteem. Suppose you were happily driving through a small city. There was a reasonable amount of traffic in the business district and you drove slowly. When you got through the center of town you saw a sign with the legend *Residential District—Speed Limit 15 Miles Per Hour*. Since there was very little traffic, however, and no children about, and since you knew that such speed limits were seldom

strictly enforced, you proceeded at a speed of 25 miles per hour. Suddenly a police officer appeared and ordered you in sharp and strident tones to "pull over to the curb." Then he proceeded to bawl you out for reckless driving, disregard of the lives of children, etc., in a very nasty tone of voice. As you listened to the harangue, you would probably become more and more angry. Hostile wishes would pass through your mind. Let us suppose you were merely touring with no particular time limit or set destination. Thus the interruption of your journey did not bother you. Actually no need was thwarted, but you were humiliated, and a need to restore your adequacy through aggression was created. Now it is your problem as to how you will regain your self-esteem and vent your hostility without landing yourself in jail.

Aggression, Thwarting, and Self-Esteem. An adolescent boy has a date with a girl to take her to a dance. Although they could get to the dance by streetcar he prefers to use the family automobile because he thinks it will make a better impression on the girl. His father refuses to let him use the car, however, saying that the boy is not a good enough driver to be trusted with it at night. The son thereupon becomes angry and humiliates his father by reminding him of the time the father smashed into a parked car. When the boy takes the girl on the streetcar, he finds that he does not mind it as much as he expected. This outcome can be explained in the following way. The boy's self-esteem was bound up with his desire to use the car; thus he was "injured" by his father's refusal. The aggression against his father, however, restored his self-esteem to such a degree that being obliged to take the girl on the streetcar no longer appeared as an important matter. The tension of the original need was somewhat reduced by the aggression. It is therefore possible in some instances for acts of aggression to reduce the original need as well as the need for aggression.

Direct Aggression. Direct aggression in response to frustration has two characteristics: (1) the object of the attack is the person responsible for the thwarting; (2) the form of the aggression is unequivocally hostile in nature. It is likely that direct

aggression achieves the greatest degree of tension reduction and consequently yields the most immediate satisfaction to the individual, as the following news item suggests.

Walcott, Minn. Oct. 2. A— D—, 30, a former waitress, knows what it feels like to slap a pie in the boss' face. It's "soul satisfying," Miss D— told reporters as she contemplated charges of assault filed against her by R— T—, operator of the Alden Cafe. "I considered it for several days and then Monday I got the impelling urge," she related. "I held the pie in my left hand and tapped him on the shoulder with my other hand. He looked up. I slapped the delicious mess in his face." The trial is set for Friday.²²

Many factors, however, stand in the way of the employment of direct aggression. Adults are frequently restrained from the use of physical violence by the social disapproval usually connected with it as well as by their own inner standards of conduct. The consideration of the consequences of the action may also be an effective inhibition. Often the frustrater when assaulted is able to evoke still more discomfort in the retaliater; the former may be in a position of authority or he may excel in strength or combative skill. There are similar barriers to the use of insults, upbraiding, cutting remarks, and other forms of verbal aggression. As children grow up, they become increasingly aware of these factors, and the forms of aggression (as was pointed out in Chapter V) becomes less direct and more subtle.

Direct aggression, of course, is impossible when the frustration is caused by natural events, when the frustrater is unknown, or when the cause of the frustration cannot be personalized, as in an economic depression. Some form of indirect aggression must be resorted to before aggressive tension attendant upon this kind of frustration can be reduced.

Indirect Aggression. Indirect aggression may be achieved by (1) changing the form of the aggression to one less clearly hostile in character, by (2) changing the object of the aggression, or by (3) changing both form and object. Various degrees of disguise or concealment of hostility may be effected, as was mentioned in Chapter V, by innuendo, criticism of the frus-

trater's behavior or accomplishments, as well as by belittling him to others, gossiping about him, piercing his pretensions through wit, making him the butt of practical jokes, and by many other methods. Some people take advantage of games or sports involving physical contact such as boxing, wrestling, or football to vent their hostility indirectly. Children frequently use noncompliance with the requests of their parents as an indirect means of retaliation for frustration. Any competitive endeavor may be used as a vehicle for worsting one's frustrater. When disguised means are not available, or when they are afraid that the disguise may be penetrated, individuals may use fantasy of aggression as a substitute for action.

Aggression is said to be *displaced* when it is not directed against the frustrating agent. As has been mentioned, when the source of the frustration lies in a natural event, and consequently when direct aggression is impossible, indirect aggression may take the form of a hostile act against a substitute. Usually a person is substituted, but groups of individuals, persons-in-general, domestic animals, or even inanimate objects may serve the purpose.

Aggression Turned Inward. Under certain circumstances, aggression may be displaced by an individual's identifying himself with an aggressor or by directing against himself the hostility evoked by the acts of his frustrater. Turning aggression inward seems, at first glance, like adding insult to injury; to add, apparently, to one's own distress seems absurd. Yet it may be done even by normal people. The basis for such behavior is the tremendous fear that one's hostility will issue into action and result in renewed aggression on the part of the frustrater—aggression of such violent nature that one could not bear it. Identification with the aggressor has the same basis. Both kinds of behavior have been found in neurotic children²³ and among prisoners in Nazi concentration camps.²⁴ Some of the prisoners who had been in the camps for years tried to dress and speak like Gestapo guards; they also adopted their tormentor's brutal attitude toward new prisoners, and even to some extent shared their Nazi ideology.

The Displacement of Aggression to Another Individual.

An example of the substitution of another person for the frustrater is found in the studies of Lewin *et al.*,²⁵ In the groups in which the boys were constantly frustrated by the adult leader—the so-called authoritarian groups—one of the boys (whose behavior toward individuals in this situation differed in no way from that of the others) was subjected to so much aggression from the other boys that he withdrew from the club. A teacher who is reprimanded by the principal may use the opportunity afforded by a pupil's slight violation of classroom order to upbraid him severely; or a mother, exasperated by her husband, may, in his absence, spank her child for a very minor misdemeanor. The person who is substituted, as these illustrations show, is typically one who is not in a position to retaliate effectively.

The Displacement of Aggression to a Group. The most clear-cut instance of aggression displaced to a group is found in the history of Germany during the 1930's. While the source of the frustration of the German people may be considered largely economic, with the assistance of Hitler's propaganda machine, a good deal of the aggression arising therefrom was displaced onto the Jews. Occasionally one finds displacement onto people in general. Some delinquents and criminals are motivated, at least in part, by a desire to release against society aggressive impulses originating in frustrations due to personal defects. It may well be that vandalism in parks and public property as well as the annoyances and destruction accompanying Hallowe'en are displacements of aggression arising from the unnecessarily stringent restrictions of certain adults on the activities of children and youths.

Evidence of Aggression from Children's Play. It is said that when Sir Francis Galton was a child he would go to his bedroom and pound his pillow after being thwarted by his mother. Whether the pillow was a conscious symbol for his mother or whether it was dimly conscious or even unconscious, it is impossible to say. It is likely that it was dimly conscious. That at least is an interpretation in keeping with the opinions of most

play therapists who devise situations in which disturbed children can release aggressive impulses symbolically. The common arrangements involve dolls representing different members of a family. Although the composition of the family group reflects that of the particular child, no attempt is made by the therapist to identify the dolls with the child's family. The father doll is merely called the father, and the doll representing the patient, the boy (or the girl, as the case may be). Solomon gives the following account of the behavior of an eleven-year-old boy in such a situation.

He then held the doll representing the father in one hand and the boy doll in the other. He had the father strike the boy first, then the boy struck the father. He alternated back and forth that way with the greater amount of damage done to the father. . . . He then beat the father doll unmercifully. The boy doll jumped on him and hit him, then he threw it all over the place. He continued doing this for about five or six minutes without let up.²⁸

A dimly conscious identification with the doll representing the child is probably made in the play therapy situation. As has previously been indicated, some individuals, especially children, are able to achieve a degree of tension reduction through identification with the characters in stories of the blood-and-thunder variety or through painting or drawing scenes of carnage and slaughter. Fantasied aggression provides an outlet for some, as is shown later. No examples need be given of indirect aggression, in which a change occurs in both form and content. Suffice it to say that this happens whenever disguised or concealed aggression is used against a person other than the frustrater.

The Individual's Awareness of His Displaced Aggression. The degree of awareness, as has been mentioned, plays a role in the form and object of aggression. When the aggression in response to frustration is direct, the whole operation appears to be a conscious one. With indirect aggression, it is safe to assume that full consciousness seldom exists. When a boy, struck by a larger one, in turn hits a boy smaller than himself,

it is likely that the displacement is conscious; but such instances are rare. Most typical are the cases cited of the displacement of aggression from the leader of the authoritarian group to one of the members, the teacher's displacement onto the pupil, and the mother's venting her wrath against her son instead of her husband. It is probable that these displacements are unconscious or, at the most, dimly conscious. Likewise, disguised aggression often occurs without full awareness. In many instances, there may even be mixed motives rather than the expression of purely aggressive feelings. This is often the case when wit or criticism is directed at the accomplishments of a frustrater.

Evaluation of Aggression as a Means of Tension Reduction. The evaluation of the usefulness of aggression as a means of tension reduction is difficult. When the person is humiliated, discharge of tension may be obtained through aggression—most satisfactorily through direct physical violence. As we have seen, however, situations in which this means of discharge has no unpleasant consequences are limited. Usually when a boy makes a physical attack on another boy who has been bullying him his action is socially approved, but the tension will be discharged only if he wins, often a doubtful outcome. Counter-aggression must always be considered. The child who struck his mother and the adolescent who criticized his father did not expect punishment for their behavior. Even though direct aggression constitutes the most satisfactory means of expressing hostility, it is obvious that no social order can permit very much of this kind of behavior.

Fite has expressed this anomalous status of aggression in saying: "Impulses to aggression . . . are a source of anxiety and conflict to every human being. No one knows how to deal with them nor how they should be dealt with. No one is happy with them and no one can exist without them."²⁷ According to Dollard *et al.*: "When aggressive responses are inhibited they constitute a permanent threat to personal integration . . . A chronic condition of helplessness, dependence, and frustra-

tion may be induced by the complete inhibition of overt aggressive responses." 28

On the brighter side it may be said that displacement of aggression onto inanimate objects as in the case of Sir Francis Galton, or through play therapy, or release of aggressive feeling through reading, painting, drawing, and the like, or through games or sports involving physical contact, or through identification or daydreaming, reduces tension and yet may entail no unpleasant social consequences nor harm to the personality. Individuals seem to differ, however, in the amount of tension reduction that these means afford. Some find little value in them. Perhaps occasional direct aggression in response to frustration is helpful for personality development, but how this is to be effected remains, at the present time at least, an unanswered question.

Finally, it should be mentioned that some people find it easier to cope with their aggressive impulses when they discover that it is natural for all people to have occasional hostile feelings. John Levy, a psychiatrist—one of a profession whose members have exceptionally good control over their feelings—said: "There are moments when my best friends make me sick. I would enjoy punching them on the nose. Yes, the women, too!" 29

ILLUSTRATION OF THE USE OF DIRECT AND INDIRECT METHODS

In describing the different methods of tension reduction, we have been forced for the most part to deal with each one separately. Little attempt was made to show how a person might try out a series of different methods in an effort to satisfy a need or fusion of needs. In the following "case"—actually a composite of many clinical observations—Masserman has given an excellent (though polysyllabic) illustration of that very thing.

A married woman with strong conscious or unconscious maternal cravings finds herself incapable of bearing children because

of pathologic obstructions in her Fallopian tubes. Such a patient has a wide variety of behavioral patterns available to her from which she may, more or less consciously, select any combination that most nearly approximates her needs. Let us consider these possibilities briefly:

To begin with, if she is unaware of the reasons for her sterility, she may consult a gynecologist for a physical examination and diagnosis, have the fecundity of her husband's semen checked, follow any indicated medical or surgical procedures to correct his or her sterility, and then have intercourse under conditions most favorable to impregnation—a behaviorally elaborate but . . . direct and progressive course toward her final goal of maternity. Or, still acting "normally," she may accept her own sterility as an inevitable frustration and attempt to satisfy her maternal longings by substitutive means: *e.g.*, adopting a child, or becoming a kindergarten teacher and so being entrusted with the part-time care of many children. If these outlets are blocked by external circumstances or by inner conflicts involving jealousies of, or aggression toward children, her behavior may become more deviously substitutive and symbolic: she may keep cats or parrots, or found a pet hospital, or join an anti-vivisection society—in all of which activities her behavior could range from "normal" to the borderline of what most observers would characterize as fanatic. Or, if she finds such remote gratifications inadequate, the patient may abandon all direct or indirect efforts to resolve her specifically maternal needs and attempt instead to seek substitutive satisfactions for alternative narcissistic, erotic or other nonmaternal urges: *e.g.*, in regressive dependency, sexual promiscuity, multiple marriages, social or economic aggressivity. . . . Here again the "choice" and intensity of her reactions will depend on patterns of adaptation to frustration laid down in her previous experience, but her behavior as thus far postulated may even yet remain within the limits of the socially acceptable—unless, of course, it is complicated by an excessive resort to drugs or by a furor of anxiety-driven activity reaching the hypomanic level.

Finally, however, if these diversions alone should prove inadequate while the unconscious maternal drives continue strong and undeniable, their satisfactions by more abstractly symbolic, fantastic . . . devices might be attempted, in which case her behavior will become "neurotic" or "psychotic." For example, the

woman, still driven by her unconscious desires to be pregnant, may express them "psychosomatically" by developing functional amenorrhea, morning nausea or even pseudocystic abdominal enlargement. If, on the other hand, her wishful fantasies harden into delusions, she may insist that she *is* pregnant despite all external evidences to the contrary, and invest her belief with various grandiose, persecutory, religious or other ideational content; e.g., that she had been "drugged and raped," or that she is destined "to give birth to a new Messiah."³⁰

Actually it is highly unlikely that behavior would go to the extremes indicated because of a frustration of her maternal need alone. Such might be the case, however, if in addition to this frustration, she had other severe internal and external thwartings.

FURTHER EVALUATION

As we have seen, it is difficult to assess the value or harmfulness of any particular method of tension reduction on the basis of its contribution to the long term happiness and efficiency of the individual. The following questions may be helpful in pointing out some of the criteria that afford a partial basis for such evaluation.

1. Does the specific behavior in response to the thwarting adapt the individual to the objective situation?
2. Does it discharge or merely reduce tension? If it reduces it, to what extent does it do so?
3. Does it have a positive or negative effect on other people?
4. Is the method, if indirect, used to tide the person over distress as a temporary measure or as a permanent method?

Although the answers to these questions are helpful in evaluation, no fundamental judgment can be made without full knowledge concerning both the individual involved and the situation in which he finds himself.

It must be remembered that some of the methods of tension reduction described in this chapter also serve other purposes. Aggression, when defined broadly, may spring from a variety of motives. The process of identification may be used in an effort

to understand another person. Even projection may refer merely to a general tendency to perceive one's own unacknowledged traits in others.

Caution must be observed in the application of knowledge gained from the discussion of these methods. It is necessary to be extremely careful in inferring from the observation of behavior the need which underlies it or the possible mechanism employed. If all criticism is attributed to concealed aggression, all postponement of tasks to withdrawal, such interpretation is not only unwise but incorrect. Many of the examples given of the different methods of tension reduction might in certain circumstances be interpreted differently. In presenting the material of this chapter a certain amount of simplification, perhaps oversimplification, was employed. It may be well to keep in mind as a corrective Allport's statement: "The truth of the matter is that man's conduct at any given moment is produced by an unanalyzable emergence of many determining tendencies." ³¹

SUMMARY

Many methods are used in an attempt to restore harmony between the individual and his environment. When a person has been frustrated, deprived, or humiliated, he is likely to reduce the tension of the need by taking certain kinds of action.

These methods of tension reduction may or may not be in keeping with the long term adjustment of the person. They are, however, always pointed toward the relief of a feeling of distress.

Direct methods are typically conscious and rational; and the needs for which satisfaction is sought through them are conscious also. They are typically employed to solve a particular adjustment problem once and for all. They include (1) renewed attempts to reach the original goal, (2) substitution of other goals, and (3) analysis and decision.

Indirect methods, often called *mechanisms*, are employed solely for the alleviation of unpleasant tension. They may solve the long-term adjustment of the person through aiding him in

maintaining sufficient courage and energy to grapple with life's difficult problems at a later time. These methods include (1) sublimation, (2) withdrawal (including regression and day-dreaming), (3) identification, (4) becoming dependent, (5) rationalization, (6) repression and its auxiliaries, projection and reversal formation, and (7) atonement.

Compensatory methods cannot be thought of as direct or indirect methods since they include any method, conscious or unconscious, used to alleviate a feeling of inferiority.

Aggression ("an act whose goal—response is injury to an organism or organism-surrogate") is evoked by frustration, humiliation, or aggression on the part of another person. Aggression is not an inborn drive. Usually aggression reduces only the tension of the need for aggression, but in certain circumstances it may partially reduce the tension of the original need which was thwarted. Some people are able to handle their needs for aggression in various socially approved ways, but most people stumble along in a hit-or-miss way.

QUESTIONS AND EXERCISES

1. Who is the best judge of whether an individual is rationalizing, the subject himself or an observer? What circumstances make different answers to this question possible?
2. In addition to those given in the chapter, what values and disadvantages may rationalization entail?
3. What is the best thing to do when a need is thwarted? Explain why this question cannot be given a satisfactory answer.
4. From the standpoint of long-term adjustment, under what circumstances might it be advisable for an individual to (1) avoid or limit the situation? (2) restrain emotional involvement? (3) procrastinate? (4) plunge into a number of activities?
5. Does the fact that an individual chooses between goals necessarily imply a "free will"?
6. Give instances in which direct aggression is socially approved. Do you think it should be approved in each case?
7. Thurber and the salesman both had fantasies of aggression. Assuming that the types of fantasy were characteristic of them,

CHAPTER XX



MENTAL HEALTH HAZARDS OF THE SCHOOL CHILD

The adequacy of the child's general adjustment cannot be ascribed solely to the conditions found in the school itself. Usually up to the time the child is five or six years old, the home is the principal environmental factor contributing to his adjustment, and thereafter, during his school years, he is still subject to the influences of home and community. Before he enters school, his community and especially his home should have provided for his basic organic needs and should have furnished an environment well suited to meet his needs for security and adequacy. While he is a pupil, both the family and the community continue to influence his personality development for weal or woe.

In this chapter, the influence of parents and family life, of the community, and of school practices upon the personality of the child will be discussed. As the title of the chapter indicates, the present concern is not with favorable but with unfavorable pressures on the "normal" child, as well as upon the child who already has an especially difficult problem of adjustment. Although it is helpful to recognize both desirable and undesirable influences, an understanding of the latter is a more important prerequisite for effective correction. The corrective techniques themselves will be taken up in the succeeding chapter.

EXTRASCHOOL INFLUENCES:

THE PARENTS AND FAMILY LIFE

The Influence of Poverty on the Child's Personality. An excellent description of the effect of poverty on the personality of the child has been made by Plant. He points out that "*hardening*" of the personality results from constant financial

strain. He feels that "this is not a mechanism of resignation, but the development of patterns of response . . . that prevent each experience of want (it matters little how drastic!) from resulting in the emotional reverberations which accompanied the first such experience."¹ This is similar to the reaction which Lewin² calls "encysting" in which the child attempts to make himself unassailable, in effect, by erecting a wall between himself and the environment.

A *feeling of insecurity* is a second resultant, according to Plant. Children who have suffered repeated and serious blows to their sense of adequacy from a long-continued real fear of cold and hunger are likely to show a picture of anxiety and panic. This feeling becomes so firmly bound up with the personality structure that later acquisition of a sufficient income will not remove it.

According to Plant a third resultant is a *feeling of inferiority*. This may be found in children above the lowest economic levels; it occurs whenever there is a marked discrepancy between the economic status, reflected in type of home, clothes, belongings, etc., of the child and that of other children with whom he is in contact. This feeling is likely to become heightened during adolescence when material and social problems are more in the focus of a child's interest.

Sheviakov, who made a study of adolescents employed on part-time projects of the National Youth Administration, said of them:

Probably the most prominent characteristic . . . was the lack of self-confidence. Even the well-poised, even the unquestionably very superior and gifted youths complained about their shyness and lack of self-confidence. . . . It was astounding to learn what insecure people our culture produces. It is reasonable to assume that the group studied has more insecurities—that these people are constantly threatened by the reality situation in which they face unemployment, discontinuation of WPA and NYA, cuts in the Home Relief budget, etc. Furthermore, the underprivileged youths have fewer means of bolstering their morale by decent clothes, attractive home surroundings, etc. Finally, it is a generation which grew up in

families which, some six or seven years ago, had suffered a shock, families in which the self-respect of the father and the respect of the mother for her husband had suffered a painful blow. They come from homes in which humiliation is a constant boarder.³

In addition to these factors, it is obvious that in homes with poor ventilation, light and heat, inadequate diets, and with insufficient sanitary facilities the physical health of the family suffers.

Perhaps it is unnecessary to point out that many children from poverty-stricken homes do not develop personalities with the characteristics indicated. The fact of the matter is that fertile soil for the growth of such traits is found in poor families and that enough of the children do develop such characteristics as to make them common resultants of such surroundings. Of course, there is no implication that poverty is the only condition which may produce feelings of insecurity, inferiority, and the like. Symptoms of maladjustment as well as personality traits are not the products of any single set of causes. Another factor which has an important bearing on the child's personality and behavior is, of course, the parent-child relationship. We shall consider first the situation that has the greatest distorting effect on the personality --the rejection of the child by the parents.

PARENTS WHO REJECT THE CHILD

A child is said to be rejected when he is disliked or not wanted by one or both parents, a situation which inevitably results in insufficient meeting of the child's needs for affection and belongingness. Children whose parents strongly dislike them at times but love them most of the time are not considered to be rejected; consequently the following discussion is not applicable to them.

There are still many gaps in our knowledge of rejection. We cannot distinguish as yet the supposedly different effects on the child of (1) rejection by both parents as opposed to rejection by one, (2) the sex of the rejecting parent in relation to the sex of the child, and (3) the degree of affection shown by

the nonrejecting parent. There have been, however, a series of excellent studies ⁴ which throw light on the problem, and we will draw freely from these in the course of our discussion.

Effect of Rejection on the Child. The pattern of behavior of the rejected child is reported to depend primarily on one or more of these factors: (1) a desire to win affection or at least attention, (2) a wish to retaliate against people for the hostility shown him by the parents, or (3) feelings of worthlessness and anxiety. It is, of course, incorrect to attribute his behavior entirely to one or another of these categories since, for example, *one* form of behavior (that is, activity calculated to annoy) may be based on a desire for attention *plus* a wish to retaliate.

It is typical of rejected children to show aggressive behavior. They are likely to *demand* gifts and special favors, to be negativistic, quarrelsome, rebellious, and untruthful. They are often past masters at devices which annoy adults, and are especially prone to engage in delinquent behavior. Many of them develop on apparent emotional coldness as a response to being rebuffed with the result that when kindness is shown they respond with indifference or aggression. Deep-seated feelings of worthlessness may be expressed in a variety of forms (*e.g.*, fears, seclusiveness) and anxiety may lead to what appears to be irrational behavior. Although some rejected children show, along with the types of reaction just mentioned, an independence, an ability to amuse themselves and even an occasional good social adjustment outside the home, these responses are infrequent.⁵

It is very difficult to diagnose rejection from the behavior of the child alone because children who are not rejected may show some of the same symptoms.

Expression of Rejection by the Parent. The signs of rejection exhibited by the parents vary from those which are obviously unequivocal to those which might possibly indicate dislike for the child. Rejection is easily diagnosed when the parent's feeling is fully conscious and when there is no attempt to conceal it; not so easily diagnosed otherwise.

Some parents will frankly acknowledge that they heartily

dislike their children and wish they had never been born. The majority of rejecting parents are not so outspoken, but express their feelings in the way they treat the child. *Getting rid of the child* is one of the most obvious signs of rejection. Desertion of the child or placement in an institution, boarding home, or boarding school (for the higher income groups) is a common device among rejecting parents. *Harsh treatment*, being very strict with the child, using severe physical punishment, are all too frequent practices. Continual nagging and criticism of the child, pointing out his shortcomings to him, especially in the presence of others, being unduly suspicious of him, neglecting him, are all fairly certain signs of rejection. One parental practice which may mean rejection but is frequently misjudged is overprotection (see the illustration on p. 677).

Some of the more subtle methods of expressing rejection are (1) expecting the child to live up to standards that are much too high for him, (2) never saying anything favorable about the child, (3) comparing him unfavorably with siblings or children in the neighborhood, (4) responding with surprise to favorable statements made by others about the child, (5) taking conscientious care of the child's needs but with an air of martyrdom.

Origin of Rejection in the Parent. The soil from which rejection grows is likely to be an *unsatisfactory marital adjustment*. The mother's feeling toward a disliked husband may be extended to the child. The husband may dislike the child of his unloved wife. *Interference with the sources of satisfaction* of the parents is an important cause. In homes of low economic level, the birth of a child means cutting down on necessities of life for the family in order to meet the baby's needs; on a somewhat higher level, parenthood often means giving up the possibility of further education, or drastic reduction in accustomed comforts. When the wife is employed in a job in which she takes a great deal of pleasure, childbirth means at least temporary and often permanent separation from the position.

It is probable that many children *unwanted* before, and even at the time of birth, become presently well loved. Factors which tend to prolong "unwantedness" and thus bring about

rejection are easily found in the families of children of forced marriages, and in homes where pregnancy occurred soon after the wedding, before the husband and wife had had time to enjoy their association *à deux*. *Immature fathers and mothers* who are still dependent on their own parents and who tend to take more interest in dancing, entertaining, and having a good time than in child-rearing are likely to continue to resent the presence of a son or daughter.

Unattractive children are likely to be rejected. Unattractiveness need not be as obvious to an observer as lack of beauty, a malformed body, or mental deficiency. A special quality or lack of it may make the child seem unattractive to his particular parents—a boy to parents who keenly hoped for a girl; a frail child, even though charming, to parents who emphasize strength and agility; a slow child to parents who think quickness is the *summum bonum*; even minor matters such as a lack of interest in music when the parents put a high premium on this art—these traits and others may constitute special kinds of unattractiveness.

When the *child is believed to threaten the relations between the husband and wife*—for example, when one parent becomes so occupied with the child that the previous degree of affection for the spouse seems to be lacking or to be greatly reduced—the child may be rejected by the offended parent. The situation may be even more critical when a stepparent enters the home. It is normal for stepparents to feel insecure in the new role at first, but one in whom this feeling is intense and persistent may easily begin to believe that the child is preventing a happy relationship between husband and wife.

Other causes for rejection are found in the mother who has never accepted the feminine role, and who consequently cannot bear a constant reminder that she is a woman; in the father who is so suspicious of his wife's fidelity that he questions the child's paternity; in the parent who finds reflected in the child the traits of his own hated brother, sister, or parent; in the parent whose own childhood was so deprived of affection that he or she is actually unable to accept and love any child.

There should be no implication in the preceding discussion that occasional hostile feelings on the part of a parent are to be looked upon with grave suspicion. One very happy and well-adjusted mother remarked: "Yesterday I was so annoyed with Peter that I could have cheerfully thrown him out of the window." And Levy and Munroe in discussing the parents in a "happy family" say, "They all have hostile feelings as well as feelings of love for their children. They all have moments of feeling angry, irritated, annoyed with them as well as periods of feeling very tender." ⁶

PARENTS WHO OVERPROTECT THE CHILD

A child is said to be overprotected when he is excessively cared for, shielded, and loved. As very little is known about overprotection by the father, probably because he assumes the responsibility for the child's care so rarely, this discussion will deal only with the overprotective mother. Much is still unknown about the causes and the effects of overprotection on the child, in spite of a number of excellent investigations ⁷ in this field.

Expression of Overprotection by the Mother. Overprotection may result from either domination or indulgence, or vacillation between the two. In any type of overprotection, however, the mother characteristically spends a great deal of time with the child, takes excessive care of him, and as a result succeeds in preventing the development of his independence. Specifically, she is likely to sleep with the child for years, amuse, play with, and fondle him for hours at a time. She is likely to postpone self-feeding, bandage every scratch, be particularly careful of his diet, call in the doctor upon the slightest excuse, and keep him too warmly clad. She prevents him from taking the slight risks children are so fond of (such as climbing trees); never lets him play with any except the "nicest" children, and even then will watch him constantly; walks to school with him even when all his classmates are going alone or with friends; and makes up his mind for him at every opportunity.

The dominating-overprotective mother tends to use forceful means in achieving her ends. She will insist on complete obedience and directly frustrate his wishes. The overindulgent-overprotective mother characteristically gives in to the whims of the child, gives him special privileges and achieves her ends through indirection, avoiding a clash of wills with the child at any cost.

Effects of Overprotection on the Child. Children of both dominating and overindulgent mothers often lack self-reliance. In both cases they have been for so long dependent on their mothers that they are unlikely to be able to assume responsibility for tasks or for minor life-problems. They continue to find their security in the presence of their mothers, in whose absence they find it difficult to cope with the world.

A typical instance of what may happen even in middle age when the props of overprotection are removed by the death of the mother is found in the following case.

H.K., [a man of about 55] said he started drinking four years ago when his mother died. She was 82. Until then he had held steady jobs, usually in the delicatessen and grocery lines. He had been an only child; his father had died in 1914.

"So I stuck with my mother all the way," he continued. "Who the hell wanted to get married? I wouldn't marry the best girl walking around. My mother was a wonderful woman. She was a real, old-fashioned home lady who believed in keeping the home right. I never had to send my shirts to the laundry. They were always fresh and clean in my drawer. When I came home at noon my lunch was there and when I came home for supper my supper was there. And she made my breakfast, too. She put money on the side for me and when she was ready to kick off she told me where she had put it away, and I found it there, too.

"I had the best mother anybody ever had. As long as I had her, I didn't worry about anything. I loved my mother and when I lost her I lost everything. I didn't give a damn what happened to me after that, I just let myself go. I started drinking and I worked only when I felt like it. Until then I wasn't a drinker."⁸

The personality and behavior of the "spoiled" child (the child of the indulgent mother) is likely to differ in significant

ways from that of the dominated child. The "spoiled" child strives to bend the world to his demands through an aggressive, demanding type of behavior. Egocentric and selfish, he wants his own way at all times and rebels against authority and responds poorly to tasks which do not immediately appeal to his interests. Although he may appear to be self-assured, this usually conceals a hidden anxiety.

The dominated overprotected child, on the other hand, is likely to be submissive, obedient, and to withdraw from situations that he finds too difficult for him. He is likely to feel inferior and anxious and is less likely to cover up his feelings with an air of bravado than is the spoiled child. In general his behavior may be characterized as infantile, in that it appears similar to that of a much younger child.

Origin of Overprotection in the Mother. David Levy has listed the following immediate and remote factors as causes of overprotection:

1. Long period of anticipation and frustration during which the woman's desire for a child is thwarted by sterility, miscarriages, or death of infants.
2. Conditions in the child that make him less likely to survive than other children: physical handicaps, illnesses which frighten the mother, and the like.
3. Sexual incompatability with husband.
4. Social isolation: lack of common interests between husband and wife; lack of other social contacts.
5. Emotional impoverishment in early life: unhappy childhood, particularly from the point of view of individual satisfactions.
6. Development of dominating characteristics through the assumption of undue responsibility in childhood and the continuance of this role in marriage.
7. Thwarted ambitions."

Researches of others have in general tended to support Levy's conclusions, although in one study little difference was found between the overprotective mothers and the "normal" controls in factors 4 and 7. An additional factor, not mentioned

in Levy's list, is a feeling of guilt based on the lack of desire for a child on the part of the mother coincident with a strong desire by the father. When this feeling is followed by attempts at abortion and wishes that the child would die, overprotection on the basis of rejection may occur. It should also be noted that factors 3, 5, and 7 are also found as causes of rejection. It is easy to see how this can occur. One mother, for example, may reject her child because of her own resentment over her own thwarted ambitions, another may overprotect and dominate in order to make sure the child will become what she wanted to be and thus enable her to achieve her ambition vicariously through her child.

It should be emphasized that it is no small task even for intelligent and well-meaning parents to strike the right balance in determining just the proper amount of protection which the child needs. As a matter of fact, with the present state of knowledge, even if a parent had an optimally stable personality, errors of judgment would frequently be made. Fortunately, a child is not as easily molded as clay and if his fundamental needs are reasonably well met, occasional inappropriate methods of child-rearing are no more likely to wreak permanent damage to his personality than is a feather to scratch concrete. Even those parents whose lives and personalities include one or more of the predisposing factors mentioned are not fated to overprotect their children, though there is somewhat greater likelihood that they will. If they are aware of their tendency, however, they are unlikely to overprotect to a harmful extent.

PARENTS WHO SHOW FAVORITISM

When a strong preference is shown by the parents for one child the effect on both the favored and the unfavored child (for simplicity of discussion, only two-child families will be considered) is likely to be unfortunate.¹⁰ The favored child may reflect, though in a mild form, the characteristics of the overindulged child. The unfavored child is practically certain to show some form of jealousy. Young children often make bodily attacks on the sibling, although direct aggression against the

sibling is not always shown in their behavior. Because of the feeling of injustice and lack of sufficient affection, they may exhibit negativism, restlessness, fighting, and attention-demanding activities especially in relation to their parents but also in relation to other adults and children. The behavior of all unfavored children does not show aggressive characteristics. Some will become despondent and withdraw. Others will throw great energy into competing with the sibling in socially approved activities, and still others will try to behave as differently as possible from their rival.

Although it would probably be ideal if parents felt and showed the exact amount of affection that each child needed, it would require paragon parents (who have not yet been born) to achieve this result. Most parents are likely to feel a preference in some degree for one child, but the effects are not likely to be serious unless a clear difference exists both in the attitude of the parents and the differential treatment of the children. As was pointed out in Chapter V favoritism is not the only cause of jealousy, and occasional feelings of sibling jealousy occur in all homes where there is more than one child.

PARENTS WHO HAVE INORDINATELY HIGH MORAL STANDARDS

Children from homes with moral standards much more rigid than those of the rest of the community may be taught that sex is evil, that one thousand and one normal activities are sinful, *e.g.*, smoking, card-playing, going to the movies or the theater, dancing, and reading modern novels. This makes it inevitable that the child will meet numerous situations which would never have been a problem for him if it had not been for his rigid moral training. The most serious result is that children who accept this teaching acquire such severe consciences that they believe they are continually failing to live a proper life. Normal social relations are almost impossible for them in an average community and, all too frequently, they develop neurotic tendencies. Those who rebel may be somewhat better off, though such rebellion seldom comes before

adolescence, and for a child with such training the consequent severing of home ties is a very painful process.

OTHER DAMAGING FAMILY CONDITIONS

The undesirable effects on personality of the rigidly moral home should not be taken to mean that the immoral home provides a better environment for the child. If the child has as patterns parents who are dissolute, delinquent, and often drunk one cannot expect the child to have admirable personality traits. If the conscience remains undeveloped, as it usually does in such a home, the result is a self-centered individual with no social feeling who is very likely to become a menace to society.

The effects of the home broken by divorce or separation are too familiar to relate. It should be remembered, however, that the insecurity is as likely to affect the child in a home where there is constant fighting, recrimination, and abuse as in a home where separation or divorce has cut the Gordian knot.

The child whose immigrant parents bring with them the cultural practices of the land of their birth is frequently in a difficult position when he has to adjust to American cultural practices as well as to the more or less varying standards among his associates. Conflicts as well as feelings of isolation in the individual are likely to be frequent. When to this is added the baneful effects of poverty, the interference with personality development is obvious.

FREQUENCY OF HARMFUL FAMILY CONDITIONS AND THEIR EFFECT ON THE ADULT PERSONALITY

When discussing homes in which poverty, rejection, overprotection, favoritism, and other specific conditions damaging to personality development exist, it was not possible, because of lack of data, to state how frequently each condition is found. A recent study by Bolles, Metzger, and Pitts¹¹ does, however, afford some indication of the frequency of homes which can be considered predominantly harmful to personality development. These investigators interviewed 142 women psychiatric patients suffering from functional mental disorders, making in-

quiries concerning their early home background and parent-child relationships. They obtained the same information from 153 "normal" women, who were selected because they were "not under medical care for either physical or mental illness" and because they were similar to the abnormal group in socioeconomic, religious, racial, and cultural backgrounds. The results of the study are summarized in Table XVIII.

TABLE XVIII
EARLY HOME BACKGROUND OF "NORMAL" WOMEN
AND PSYCHIATRIC PATIENTS*

	<i>Normal Women Per Cent</i>	<i>Psychiatric Patients Per Cent</i>
I. Very unfavorable home (evidence of factors conducive to marked insecurity and instability)	1	17
II. Unfavorable home (evidence of some factors leading to instability and insecurity)	17	33
III. Slightly unfavorable home (evidence of factors which might, under certain conditions, make for insecurity and instability)	32	25
IV. Favorable home (no evidence of factors conducive to insecurity and instability)	50	25
Total	100	100

* From Bolles, Metzger, and Pitts, "Early Home Background and Personality Adjustment."¹²

Looking first at the results in Table XVIII for "normal" women, let us ask, "What proportion of present-day American homes can be considered unfavorable to personality development?" If we assume that the homes dealt with in the study constitute a fairly representative sample of homes as they exist today, the figure is 50 per cent. Perhaps it would be wiser to accept the figure obtained by adding rows I and II, or 18 per cent, as more indicative of really "bad" homes.

It should be noted, however, that despite this unfavorable early home environment, these women were considered normal. Mere absence of treatment for physical or mental disorders in the "normal" group does not necessarily mean that no per-

sonality difficulties existed. Nevertheless it is a fair indication that no serious neurosis or psychosis was present among them. Hence we may infer that unfavorable parent-child relationships and early home background do not necessarily produce mental disorders.

When we compare the results for the psychiatric patients with those of the normals, we find that a greater proportion (75 versus 50 per cent) of the former came from unfavorable homes, and 50 versus 18 per cent came from homes in categories I and II. The inference is that unfavorable homes, although they cannot be considered solely responsible, definitely facilitate the development of poorly adjusted personalities.

The results of a more recent study¹³ based on relatively intensive investigations of 78 former foster-children, now adults, are consistent with the data just presented. Since about 20 per cent of the children had psychotic parents, it may be that the results are loaded in the direction of a maladjustment appearing in a fairly good environment. The authors were not impressed sufficiently with the differences, however, to give these subjects separate treatment. In any case they found that "unsatisfactory" and "very unsatisfactory foster" home care produced no "very well-adjusted" adults and "very satisfactory" foster home care produced no "maladjusted" adults. However a large number of "well-adjusted" and "fairly well-adjusted" did come from "satisfactory" homes, and a number of maladjusted adults came from "fair" and a few from "satisfactory" homes. From these results we may draw inferences similar to those drawn from the previous study, *i.e.*, that unsatisfactory homes *tend* to produce maladjusted adults but do not inevitably do so and that satisfactory homes usually but not always produce well-adjusted adults.

EXTRASCHOOL INFLUENCES: THE COMMUNITY

Community influences on child personality adjustment are so multiform and the literature dealing with them¹⁴ is so indefinite that it is impossible to treat the topic adequately in a

short space. Some community conditions obviously important to children are: (1) the extent to which recreational facilities, social centers, and social agencies exist, (2) the degree of freedom allowed children by community folkways, (3) the disparity in economic levels, (4) the extent of race prejudice, (5) the extent of tolerance or intolerance of religious sects. These are only a few of many community factors which indirectly affect the favorable or unfavorable development of children's personalities. A more general factor which should be mentioned is that of the *organization* of the community. A study of nineteen small towns revealed four well-organized (strong) communities, two moderately well organized, and thirteen more or less disorganized (weak) ones.

In general, the four strong communities showed a slow rate of social change, marked racial homogeneity, well defined traditions, considerable local pride, ability to unite in achieving common goals, moderate contacts with the outside world, no serious inner conflict, no marked social stratification, and strong leadership.

Weaker communities were characterized by racial divisions, general apathy and indifference, clashes over common community concerns, personal factions and malicious gossip, economic inelasticity, numerous outside contacts, divided leadership, and *considerable personal maladjustment*.¹⁵

Other community conditions (as well as factors in the home) are given in the excellent list of forces damaging to security feelings, self-esteem, and socialization of the child made by Maslow and Mittelman,¹⁶ which we shall use by way of summary for this section.

A Sampling of Forces Damaging Primarily the Security Feelings of the Child.

1. Cultural Factors:

Subcultural conflict

Color, class, racial, or religious prejudice

Poverty

Chronic unemployment

2. Factors in Earlier Childhood:

Parental rejection or neglect (lack of love)
Parental overprotection
Broken families
Tension, quarreling, or divorce of parents
Parental dishonesty and insecurity
Identification with insecure individuals
Social isolation
Inadequate or incorrect sex education
Traumatic experiences
Unjust, inconsistent, or excessive physical punishment

3. Current Situational Factors:

Chronic conflict
Chronic frustration
Humiliations and ridicule
Irregularity, inconsistency, injustice, cruelty
Sibling rivalry

A Sampling of Forces Damaging Primarily the Self-Esteem of the Child.**1. Cultural Factors:**

Authoritarian family structure
Authoritarian education in the schools

2. Factors in Earlier Childhood:

Dominating overprotection by the parents
Domination by others
Rivalry with older siblings
Chronic invidious comparisons with others by parents
Over-severe discipline and punishment
Lack of praise, respect, appreciation
Favoritism in the family
Identification with weak individuals
Lack of independence, long-continued dependence
Punishment by terror or shock

3. Current Situational Factors:

Organic inferiorities
Inadequate achievement, failure

Feeling of difference from others

Snobbishness or rejection by other children

Inability to meet cultural demands for masculinity or femininity

Over-severe ideals, feeling of sin or guilt

Being regarded as a baby

A Sampling of Forces Damaging Primarily the Socialization of the Child.

1. Cultural Factors:

Social disorganization

Subcultural loyalties

Poverty

2. Factors in Earlier Childhood:

Pampering, overindulgence, lack of discipline

Direct acquisition of bad habits from others

Lack of positive training in etiquette, manners, etc.

Training in foreign folkways

3. Current Situational Factors:

Identification with wrong people

Boredom, lack of play opportunities

EFFECT OF SCHOOL PRACTICES ON CHILDREN'S BEHAVIOR AND PERSONALITY

One day the principal of a New York City school received a letter from a boy who had recently moved into another school district. Below is a copy of the actual letter except for changes in names.

Dear Mr. White:

There comes but once in every young man's life, a favor to be asked of another man. Mr. White, P.S. #X is where I belong, it is where I started from and built a career which is unfinished. In 7B I taught geography in Mr. Walker's room. I was to be President of the 7th year auditorium. I was made Captain of the supply room. I swam for P.S. #X in the Junior High School meet. All this I have mentioned was taken away by being transferred to another school which is far from P.S. #X.

Sincerely yours,
John Kuznets

Before he had time to reply, the principal received a second letter.

Dear Mr. White:

At the present time I am attending P.S. #Y. I know you think it's a long walk from my house to P.S. #X, but I'm willing to sacrifice anything in order to get back to P.S. #X. In my early letter I told you of the opportunities that were taken away from me. My career still lies in P.S. #X. I am in 8A and want to come back and finish the career of mine which lies in P.S. #X. I know most of the teachers and can prove a scholarship student.

Sincerely yours,
John Kuznets

P.S. Hoping for a good answer.

These letters afford a clear indication that John, and presumably the other children in P.S. #X, had a definite feeling of belonging to the school and received a great deal of satisfaction from attendance. How many schools succeed in cultivating such an atmosphere it is impossible to say, though there is every reason to believe that their number is rapidly increasing. Many rather common school practices, however, do not produce such feelings in children; in fact, they may be said to interfere with good pupil adjustment. What some of these practices are will now be discussed.

The Effect of Overcompetition in School. The topic of competition has already been discussed in Chapter V, so at this time we shall deal only with certain aspects conducive to excessive competition. Many authorities feel that the whole system of grades, examinations, and marks tends to place an undue emphasis on competition. The result in many cases is to discourage the slow learners and even many average pupils. The relatively fast learners are likely to get inflated notions of their own abilities. Excessive competition tends to breed an indifference to the welfare of others and to enhance self-interest.

Examinations, especially long ones, when used as even a partial basis for marks in a highly competitive atmosphere, are likely to cause an undue strain and fatigue in many children.

The attendant strain may be increased in schools in which the results of examinations are used as the primary criterion for rating the effectiveness of the teacher without taking into account the level of ability of the class. When examinations are used primarily for diagnostic purposes—to detect areas of weakness in the children's knowledge and skill so that subsequent work may be better directed—then they are serving a worthy purpose.

Unsuitable Curriculum. If, as too frequently occurs, the curriculum has little relation to the life problems of the children and makes no contribution to their present needs, many unfortunate effects are produced. Antagonism to the school accompanied by misbehavior may be expected, and a desire to "quit school" at the earliest legal age is likely to be born and nourished. Inquiries into the cause of delinquency have shown that some bright delinquents were first attracted to the questionable thrills of stealing as a result of their intense boredom with the curriculum of their school. Equally unfortunate is the plight of youngsters in many schools who are expected to master material beyond their ability. Prescott very aptly comments:

A child who has found continuous difficulty in learning the things which he saw other children learn in school, . . . a child who has been confused over and over again by the complexity of the material and energy factors met in earlier experience can hardly be expected to mobilize his knowledge and integrate his energy output into effective behavior patterns. Children need to feel adequate in capacity and skill to meet a fair proportion of the situations which they are called upon to face. They need to obtain a fair balance between success and failure in the realization of their hopes and desires.¹⁷

Overrestriction in the Classroom. Many elementary and secondary schools unduly restrict the behavior of their pupils. The ideal of many schools is pin-drop quietness and a "place for every child and every child in his place." The traditional recess periods and the occasional "working at the board" are far from sufficient for most elementary school children's need

for movement and activity. In the primary school, the needs for both activity and rest are usually handled satisfactorily, but despite the difficulties adults themselves have in going for long periods without large-muscle activity, the expectation that older children and adolescents can do so is seldom challenged in practice. Pupils not only suffer from overrestriction in activity but also from lack of freedom to direct their own behavior. This factor, combined with a lack of opportunity for legitimate physical activity, usually results at least in an occasional "bursting forth" of energy disrupting to the class. The beneficial effect of permitting pupils a greater amount of self-direction was described in Chapter V. Flexible time schedules are harder for the elementary school teacher to handle and very much more difficult to arrange in high schools than are the usual rigid ones, but because of their many advantages to the pupils they are well worth the effort.

Teacher's Methods of Handling the Class. The teacher's methods of handling pupils can be considered primarily a function of his personality and his knowledge. His skill is dependent not only upon knowledge of children in general, but also upon knowledge of the individual children in his class and knowledge of how to meet the personality needs of children and control their behavior in ways beneficial to them. There is likely to be a close relationship between the teacher's personality and the methods of controls he naturally tends to use.

The personality traits that pupils like and dislike in teachers were studied by Hart¹⁸ from descriptions of the best liked and least liked teachers that 3,725 high school seniors had had. The best liked teachers were described as helpful in school work, cheerful, friendly, interested in and understanding of pupils, patient, and fair. The least liked were said to be grouchy, nagging, sarcastic, not helpful with school work, partial, unreasonable, and unfair. (Incidentally, the pupils described approximately 75 per cent of the teachers as resembling the best liked teacher more than the least liked one.)

The Effect of the Teacher's Personality on the Class. It may be surmised that the best liked teachers provided a warm,

friendly, and relaxed classroom atmosphere in which the children could not only do their best work and have the most enjoyable time, but also would have opportunity for wholesome personality development. The least liked teachers probably had the opposite effect. Studies by Boynton, Dugger, and Turner and by Baxter tend to confirm these surmises. The first group of investigators¹⁹ concluded that emotionally stable and unstable teachers tend to have associated with them pupils who tend toward the same characteristics they show. Baxter²⁰ found that considerateness in one teacher was met by considerateness in her pupils, that a teacher "uninhibited by routine and personal bias had pupils who were free and unhampered in thought and action." A nervous and erratic teacher had pupils who tended toward the same condition, while a teacher who was weary and disappointed in life had unanimated and listless children. Some of the results of the study by Lewin, Lippitt, and White²¹ are pertinent here, too. They found as typical of their autocratic groups either hostility and aggression or apathy. The laissez-faire groups were typically dull, lifeless, or submissive. That these results were not due to the influence of the basic personality of the leader but rather to the "personality-as-expressed" was shown by evidence gathered during rotation of the leaders. That is, different leaders who handled a group autocratically evoked similar responses in the group, while the same leader who changed his methods from one type of treatment to another evoked behavior in the children consistent with the change in method.

Teachers' Report of Behavior Problems in the Classroom.

The Wickman²² study which demonstrated that teachers tended to consider violations of classroom order, dishonesties, and immoralities as more serious than recessive and withdrawing personality traits, while the opposite was true of mental hygienists, has had wide publicity. Although this study has been justly criticized as being unfair to the teachers because they were asked to rate the items on the basis of their seriousness in class, other investigations not subject to this defect have shown substantially similar results.

One of the most interesting recent studies was made by Campbell.²³ She asked New Jersey rural, village, and city school teachers in eighty-three classrooms ranging in grade from the first to the sixth to keep records of "the most important problem or problems observed each day." She also asked them to describe the treatment techniques they employed to handle the problems. Some of her results are presented in Table XIX.

TABLE XIX
CLASSROOM BEHAVIOR PROBLEMS AS REPORTED BY TEACHERS*

<i>Nature of Problem</i>	<i>Number of Times Observed</i>	<i>Percentage of Total Problems</i>
I. Violation of classroom order (disturbing others, making noises, attracting attention, talking)	501	40
II. Difficulties with authorities or rules . . . (disobedience, chewing gum, passing notes, rudeness)	191	16
III. Difficulties in application to work . . . (inattention, untidiness, tardiness, lack of preparation)	272	22
IV. Aggression toward other children	167	14
V. Immorality	96	8
VI. Withdrawing and recessive personality traits	3	0.2

* From N. M. Campbell, *The Elementary School Teacher's Treatment of Classroom Behavior Problems*.²⁴

The Treatment of Behavior Problems in the Classroom. The kinds of treatment techniques used are even more revealing of the lack of appreciation of mental hygiene principles. A combination of categories I, II, and III from Table XX, all essentially punishment, totals 56 per cent of the techniques used. Constructive or nonpunishment techniques comprise approximately 25 per cent. Deprivation—a method of meeting the immediate situation which may or may not have beneficent effects, depending upon the circumstances and type of deprivation—was employed 19 per cent of the time. Campbell comes to the following conclusions:

1. When treating undesirable classroom behavior of children, the teachers apply direct measures as punishment or reward. Seldom does the need for using indirect methods, such as changing the organization of the classroom situation to prevent the recurrence of the problem, seem to be recognized. Rarely is there evidence of the study of an individual to determine the cause of the mal-

TABLE XX
TREATMENT OF CLASSROOM BEHAVIOR PROBLEMS AS REPORTED
BY TEACHERS*

<i>Treatment Technique</i>	<i>Number of Times Used</i>	<i>Percentage of Times Used</i>
I. Censure (scolding, sarcasm, ridicule, threats)	1242	46
II. Extra work (kept in, required repetition, new task, replacement or repair)	248	9
III. Physical force	26	0.8
IV. Deprivation (change of seat, sent to corner or out, denied privileges)	502	19
V. Ignoring	33	1
VI. Verbal appeal or reasoning	257	10
VII. Reward through social approval	122	4
VIII. Assistance in meeting situation	249	9
IX. Reward through privilege	36	1

* From N. M. Campbell, *The Elementary School Teacher's Treatment of Classroom Behavior Problems*.²⁵

adjustment through: data from health examinations, psychological examinations, home conditions, or from information concerning social and emotional adjustment. While the teachers may have been seeking the adequate social adjustment of the child there is little evidence in the treatments themselves or in the comments of the teachers concerning the treatments to indicate that they sought to do anything other than remove the disorder.

2. The teachers rated highly successful in classroom control use rewards and give direct help more frequently than the other teachers. The teachers rated less successful in classroom control use punishment more frequently than the other teachers do.

A recent study of Cutts and Moseley ²⁶ is based on unsigned reports from 1,000 boys and 1,097 girls in the seventh grades of eight junior high schools. They were asked to answer two questions: "What is the last thing you did in your last school which you think you should not have done?" and "What did the teacher do about it?" Obviously no direct comparison between this and Campbell's study can be made. It is interesting to note, however, that, excluding deprivation, the boys reported various forms of punishment in about 60 per cent of the instances while the figure for the girls was only slightly less. Overtime work, physical force, and ignoring were reported three or four times more frequently than in Campbell's study; censure only one-third as much; and deprivation and verbal appeal or reasoning at about the same rate.

IMPROVEMENT IN HANDLING BEHAVIOR PROBLEMS IN THE CLASSROOM

The investigations of Campbell and of Cutts and Moseley both indicate that teachers' methods of handling "undesirable classroom behavior" could be improved. It is likely, also, that a great deal of improvement could be effected through the teacher's increased knowledge of principles and techniques of handling such behavior without an antecedent change in his personality.²⁷ It is possible that a *virtuous circle* might be set up, *i.e.*, improved methods would result in improved behavior of the pupils which in turn would improve the teacher's morale and result in an increasing interest in improving techniques still further.

Naturally there is no indication in the preceding discussion that the average teacher is an incompetent person continually interfering with the adjustment of his pupils. In evaluating the above results, it should be recognized that in being much concerned with classroom order, protection of property, etc., the teacher is only carrying out the role expected of him by society as represented by boards of education, school officials, and parents. Not infrequently a whole administrative setup and point of view need a restructuring of goals if the children are to

profit most from the potentialities of a good school environment.

Despite the number of handicaps under which the teacher labors, there is much evidence that he is doing a good job. The findings of Hart, already mentioned, bear out this contention. There is also some evidence that even teachers with poor personalities and methods have a less harmful effect upon the adjustment of some pupils than might be expected. After an intensive study of forty-nine children under three different teachers, Griffiths, Stimson, and Witmer ²⁸ conclude:

Children who came from emotionally favorable homes were apparently little handicapped in their adjustment by having a teacher who used poor methods or who was psychologically unfitted for her work, but children whose home situations were poor needed the help of a good teacher to achieve an even moderately good adjustment in school.

CHILDREN WITH SPECIAL PROBLEMS OF ADJUSTMENT

The Physically Handicapped Child. Physically handicapped children because of their condition suffer more frustrations than the average child. They miss the usual play and social activities and are usually slower in their school work. Besides having fewer immediate opportunities for social recognition, most of them must look forward to a vocational future that is far from satisfying. As a result of their physical condition, also, unwise parents and teachers are likely to overprotect them.

It is not unusual, therefore, to find self-consciousness, sensitivity, timidity, self-pity, and a feeling of inferiority among their personality traits, and withdrawal as a favored means of meeting difficult situations. Wise handling may do much for the physically handicapped child. To avoid, in a natural manner, calling attention to his defect while at the same time arranging for special ways for him to receive merited recognition usually aid markedly in his adjustment.

The Sickly Child. The sickly child is in many respects subject to the same restrictions as the physically handicapped child. He too cannot play as vigorously or do his school work as effi-

ciently as the average child. He is likely to be considered lazy because he tires easily. Either as a reaction to the specific nature of his discomfort or because of the pampering he receives at home, he may be easily irritated. When a severe illness keeps him out of school for a considerable length of time, he is likely to be unusually worried and tense about the work he has missed. The child who has been sickly but has since become healthy has special problems, too. Often it is harder to convince the parents than the child that he is really well. Occasionally, however, the child who has acquired the habit of nonparticipation in many play and social activities and now feels inadequate in them is likely to continue his previous pattern of behavior.

The Child With Sensory Defects. Of the possible visual defects in childhood the most common are nearsightedness (myopia) and farsightedness (hyperopia). The effect on the personality is likely to be more serious for unsuspected hyperopics than for myopics because in addition to the inferiority feeling likely to result from repeated failures in school work and in sports, farsighted children are plagued with headaches and often with nausea. These conditions can make their school experience so unpleasant that truancy may result. The child with unsuspected defective hearing is likewise handicapped in those phases of school work which depend upon the auditory sense and in games and social relations with his peers. He may appear to be inattentive and stupid. The most frequent reaction to defective hearing is excessive shyness and a tendency to withdraw.

The Intellectually Gifted Child. Louttit has very aptly enumerated the most frequent sources of difficulty in the adjustment of the superior child:

1. Lack of teacher's recognition of superiority leading to an antagonism toward the school as an institution.
2. Lack of parental recognition of superiority with resulting lack of stimulation or positive discouragement.
3. Superiority over available associates so marked that social adjustment is extremely difficult.

4. Development of poor study or work habits because of lack of stimulation of classroom work.
5. Development of inferiority feelings because the child's interests and activities are not socially recognized by his group.
6. Development of a boastful, conceited personality because of unwise emphasis by adults.
7. One-sided personality development because of lack of normal social activities resulting from parental intervention or from No. 3 above.²⁰

The Dull Child. Dull children, sometimes called "low-normal" or "dull-normal," those with I.Q.'s roughly from 75 to 90, are confronted with unusually severe hazards in the ordinary public school. Few schools have a program which meets their needs. Usually they are left to sink or swim (usually sink) in classes too large to be handled satisfactorily even for the average child. The difficulty of the academic work, the speed expected of him as well as the frequent inability, because of lack of facilities, to demonstrate what talents he has, constitute the major sources of frustration in the school life of the dull child. When to this, as occasionally happens, is added the antagonism of the frequent humiliation he suffers at the hands of his classmates, it is little wonder that damaged personalities and annoying behavior result. Prescott thus describes the plight of the dull child:

Many things that he sees other children learning and doing he simply cannot learn or do. The behavior limitation set by poor capacity is a serious handicap in itself. The feelings of confusion, failure, frustration, and ineffectiveness resulting from the scorn of others who see one's failures adds another disturbing factor. Such situations involving the opposite sex, or in the home, "He's just dumb!" or "You've got to expect that from Charlie!" adds the final touches of humiliation. While tantrums, withdrawal, fighting, stealing or other compensatory behavior are very poor social remedies for the feeling of failure and exclusion, they often serve to recover for the individual a sense of his own importance.

Dull children sometimes become the dupes of brighter ones with organic inferiority and take all the chances as they jointly make their protest or vent their spleen on the school or on society

in general. . . . Somehow he [the dull child] must be brought to feel that socially useful work within the range of his capacities is truly significant despite the fact that it is not spectacular and does not draw the plaudits of the public. Opportunity for genuinely successful accomplishment and the judicious use of praise when it has been earned are effective methods of assisting handicapped children in the classroom.⁸⁰

The Isolated Child. In a study reported by Moreno,⁸¹ public school children were asked to write the names of the boy or girl whom they would like to have sit beside them in the classroom. Both first and second choices were made. It was found that the percentage of isolated children (unchosen by their classmates) varied from 15 to 35 per cent. These data indicate that an appreciable number of children in our schools are having difficulties in social adjustment. Among the underlying factors is the excessive mobility of the family. (Plant⁸² found that in suburban areas where there is a relatively high percentage of homeowners 68 per cent of the families had moved at least once within a five-year period.) When the family moves, the child's friendships are interrupted, and it is not easy to form new relationships in a neighborhood where juvenile social groupings are already pretty well set. When the child happens to be of a different race, nationality, or religion, or of lower economic status than the other children in his neighborhood and classroom he may encounter not only indifference but antipathy. The child from the broken home or from the home where he is discouraged from playing with other children may find himself isolated.

Isolated children often feel their plight keenly. They lack the status conferred by valued membership in a group and are likely to give up attempts at friendships and retire into a world of unreality. In addition, they feel that something is wrong with them, that in some way they are inferior and different from the rest of the children.

The Delinquent Child. The "typical" delinquent is a boy who lives in a "blighted area" of a city in a home of low economic level with low moral standards as well. His parents are

either not living together or are antagonistic to each other. They either utilize psychologically poor methods of discipline or reject the child altogether. His I.Q. is between 80 and 90 and he is retarded in school. Delinquency, however, may be found in children in whom not one of these factors is present. Nevertheless, the environmental mass approach to the prevention of delinquency is still the most feasible and rewarding. One community (Binghamton, N. Y.), found that through the introduction of an excellent recreational program, it ". . . was able to reduce the number of young offenders handled by the juvenile court 97 per cent."³³ Even in "blighted areas" reorganization of the local community to encourage the participation of children and adolescents in a program of constructive activities resulted in a marked decrease in the juvenile delinquency rate.³⁴

The "Inferior" Child. Children with a persistent feeling of inferiority (or inferiority complex) are by no means rare in our school systems. Allport³⁵ asked 175 college men and 100 college women to report whether they had now or formerly a persistent inferiority feeling in the physical, social, intellectual, or moral spheres. Ninety-two per cent of the men and 98 per cent of the women reported that they had had an inferiority complex. Ninety per cent of the men and 91 per cent of the women reported a persistent feeling of inferiority during the current year.

The inferiority complex stems from large discrepancies between a child's level of achievement (broadly interpreted) and his level of aspiration. Any factors which depress the first or raise the second enhance the suffering of the child. Some of the most important factors which tend primarily to lower the achievement level are: real or imagined physical defects, poor health, below average mentality, low social or economic status, or continued failure. Factors which tend primarily to raise the level of aspiration are: an undue emphasis on the child's natural inability to do things as well as older children or his parents; excessive competition in school or sports; and insistence by parents or teachers on too high standards.

- Socially undesirable reactions to persistent feelings of inferiority may be classified under two heads, the aggressive and the recessive. It is not to be expected, however, that a child will exhibit either one or the other of these types consistently; he is
- likely to show a recessive trend at one time and definite aggression at another time. Many of these forms of compensating activity have been discussed in the previous chapter, so only a summary will be given here. Aggressive reactions include delinquency, bullying, domineering behavior, and annoying attention-getting devices. Recessive reactions include self-effacement, timidity, awkwardness, envy, fear of attempting new activities, perfectionism, daydreaming, and pretended ill health. Fortunately, inferiority feelings which are so great as to threaten the security of the child are not often encountered, and often the discovery of only *one* activity in which the child can excel and win recognition is likely to alleviate them markedly.

SUMMARY

In the home, the school, and the community may be found the main influences which either reduce or intensify the effect of weaknesses already present, or tend to create maladjustment in the child with a sound genetic structure. If the child's needs are met in the home and in the community; if he receives adequate nutrition, optimal affection, suitable training, and an opportunity for developing independence from parents whose personalities are unwarped and whose relation with each other is harmonious; if he lives in a community in which playmates, play facilities, and attitudes of tolerance, are found—then he will probably come to the school with an integrated personality.

If, on the other hand, he comes from a poverty-stricken, over-protecting, or rejecting home; or one where he is discriminated against or where hypermorality or immorality exist; or from a broken or breaking home, or one in which the family standards deviate markedly from the others in the community—he will often bring to the school a personality already in need of aid.

One may infer that, on the average, less than one child in

five comes to school from a "bad" home in which there are important factors leading to instability and insecurity; and approximately one child in three comes from a home which might, under certain conditions, produce the same results.

The school, then, has the responsibility of providing a hygienic, friendly environment with understanding teachers; of aiding the continuation of sound personality growth in well-adjusted children; and of assisting the children whose personalities are already warped. Overcompetition, unsuitable curriculum, overrestriction, and poor methods of handling children are some of the factors which tend to retard personality development in any child.

Psychologists and psychiatrists have long understood that misbehavior as well as normal behavior consists primarily in seeking goals which remove or reduce the tension produced by needs. Viewed from the standpoint of society, misbehavior is the result of an unfortunate combination of factors including the child's genetic structure, the nature of his previous environment, and the character of his present situation.

QUESTIONS AND EXERCISES

1. An elementary school teacher said, "If every child in my class is not well adjusted at the end of the term, I am a failure as a teacher." What are the reasons for disagreeing with this teacher?
2. How many children in the United States come from poverty-stricken homes? What are some of the factors which tend to prevent children from such homes from developing the undesirable characteristics mentioned in the chapter?
3. Can one tell from the type of behavior which a child exhibits whether he is rejected by his parents? Why not?
4. Distinguish between the immediate and remote factors in the reasons for overprotection listed on page 705. Does the presence of any one of these factors produce overprotection?
5. Are the inferences drawn from the results of Bolles, Metzger, and Pitts (on page 709) justified? How might the extreme environmentalist or the extreme hereditarian interpret these results?

CHAPTER XXI



GUIDANCE OF THE INDIVIDUAL CHILD

"Understanding the child" is constantly stressed in modern educational circles, and quite rightly, for without it no sound guidance of the child is possible. Of course, the complete understanding of any human being is beyond the capabilities of even the wisest expert in human relationships; but it is well within the realm of possibility for the alert teacher to increase markedly his understanding of each pupil through the use of current techniques. It is the purpose of this chapter to describe and evaluate the methods commonly employed by teachers and specialists to develop an understanding of the school child, and in a later section to indicate the role of the teacher in guiding the child's adjustment and readjustment. No attempt will be made to outline a complete guidance program, but various procedures and devices will be suggested to aid the teacher in his study and guidance of the child.

ADJUSTMENT SCHEDULES

Adjustment schedules are frequently called self-report blanks, adjustment questionnaires, or inventories. It is impossible to differentiate them clearly from "tests" designed to measure such personality traits as introversion, self-confidence, etc., since most, if not all, aspects of personality are related to adjustment. The purpose of adjustment schedules is to estimate an individual's degree of adjustment or maladjustment. In their preparation, a series of questions designed to reveal attitudes, feelings, and behavior indicative of maladjustment is gathered, attempts are made to validate them, and they are administered to a representative group of individuals. From the response of this group, norms are established. Thus, when

the schedule is subsequently administered to an individual, the degree of maladjustment indicated by these answers can be compared with those of the original group. The most common way of expressing his standing is through the use of percentiles; e.g., John Smith is found to be more maladjusted than 90 per cent of high school boys. Jane Doe is found to be more maladjusted than 70 per cent of college women.

There is considerable controversy over the value of adjustment schedules. One can find opinions of authorities ranging from complete repudiation to enthusiastic acceptance. The preponderant opinion, however, tends to be somewhat skeptical. Many of the criticisms are technical¹ rather than practical in character, and although there is much overlapping between the two types of criticism, they are not identical. In a practical situation, it may be useful to employ a fairly adequate instrument for the aid it does furnish despite the fact that it has definite limitations.

Uses of the Adjustment Schedule. Before describing some representative adjustment schedules, it will be well to mention some of the reasons why such instruments at the present time do not afford a conclusive assessment of an individual's degree of maladjustment.

1. *It is difficult to formulate diagnostic questions which are understood by all and have the same meaning for all.* Eisenberg,² after administering to 219 college students the Clark Revision of the Thurstone Personality Schedule, asked them to explain what each question meant to them. For the question, "Do you get stage fright?" which, like the others is answered by circling a "Yes," a "No," or a "?" the following results were obtained. Of the 219 subjects, fifty-six explained that they got stage fright only in large or strange groups, yet thirty-two answered "Yes," seven "No," and seventeen "?." Twenty-six other subjects said they were nervous at first only, but if these eight answered "Yes," ten "No," and eight "?." To the remainder of the group, the question was unequivocal. Thus, in general, the question was a good one, but in a fairly large proportion of the cases the meaning was not interpreted in the same way. The

probability of lack of understanding or misinterpretation is increased when a question refers to an experience which the individual has not had. For example, a high school freshman who has had a minimum of social experience might well find it difficult to answer the question appearing in an adjustment schedule for high school and college students, "At a reception or tea, do you feel reluctant to meet the most important person present?" The same freshman might also find it hard to answer the question, "Does admiration gratify you more than achievement?" merely because he had not observed himself and his feelings sufficiently.

It is clear that, with some individuals, such factors tend to affect the significance of the results of adjustment schedules. Nevertheless, their practical value, though impaired, is not therefore destroyed. If all or a large proportion of the questions were ambiguous, difficult to understand, or called for an unusual degree of self-observation, it would make the value of such instruments very questionable. Fortunately the items contained in the most representative and widely used of the current adjustment schedules are predominantly clear and serviceable.

2. *It is impossible through the use of schedules which limit answers to "Yes," "No," and "?" or their equivalents to take account of intensity or acuteness of a symptom.* It is true that, as Strang says, "an extreme deviation from the normal on one item would indicate a more serious maladjustment than a mild degree of deviation on a fairly large number of items,"³ and therefore it would be expected that certain individuals would be incorrectly placed on the adjustment-maladjustment continuum by the inventory. Neuroses with but one symptom, however, are very infrequent. Usually neurotics and maladjusted persons have many symptoms of poor adjustment. Therefore, while it would be advantageous to have a measure of intensity, this lack does not impair seriously the usefulness of the instrument.

3. *It is difficult to validate an adjustment schedule.* The validity of an adjustment schedule can be enhanced by a care-

ful selection of the original series of questions. Further steps in validation frequently consist in presenting the questions to contrasting groups (*e.g.*, a maladjusted and a well-adjusted group) and discarding questions that do not reveal a clear difference between the two. The use of contrasting groups as a criterion, however, presupposes a valid method of the selection of these groups. So far it has been necessary to select them on the basis of fallible human judgment.

Despite the uncertain validity of adjustment schedules, evidence from a number of studies indicates that, *in general*, high scores, that is, the scores of individuals who answer the questions in a predominantly maladjusted direction, are indicative of poorly adjusted personalities. But the fact that a low score does not necessarily indicate a well-adjusted personality constitutes a limitation which must be taken into account.

4. *It is difficult to construct schedules with reliabilities sufficiently high for use in differentiating.* As was pointed out in Chapter VII, perfect reliability would be indicated by a coefficient of 1.00. Well-constructed adjustment schedules have reliability coefficients ranging from about .80 to .93. Thus, although they compare favorably with many widely used group intelligence and achievement tests and can be called fairly reliable, they do not always come up to the level of .90 suggested by some authorities as the necessary minimum reliability for an instrument used to differentiate individuals.

5. *All adjustment schedules must rely on frankness on the part of the subject.* It is easy to "fake" answers, and there is an easily understandable reluctance on the part of many individuals to reveal unfavorable aspects of their personalities. A number of studies have shown that signed and unsigned adjustment schedules yield somewhat different results. The point has been made that "the now prevalent pessimism with traditional question-answer personality tests because they all require the subject to be both honest and objective in his self-descriptions simply does not apply because it is what he *says* of himself that is diagnostic rather than what is in fact the case."⁴ For example, if a subject says he has "many headaches" it does not make

any difference whether he actually has them or not; the important thing is that he says he has them. There is some truth in this argument, but there seems to be some error mixed in as well. Whether what the subject says corresponds with objective reality, of course, is not important. However, whether the subject is frank, *i.e.*, expresses his real feelings or sentiments about himself is important. The subject is being frank in saying that he has "many headaches" because he thinks he has. If, however, a subject denies that he is "touchy on various subjects" because he is ashamed of "being touchy," he is to that extent presenting a false picture of his personality. In short, objectivity is not necessary, honesty or frankness is.

The degree of frankness with which adjustment schedules are answered depends in part upon the schedule itself. The phrasing of questions in such a way as to afford the individual a degree of justification for his "unfavorable" response may encourage frankness. The California Test of Personality avoids asking, "Do you play truant?" but gets at the same item through the question, "Are things frequently so bad at school you just naturally stay away?" Perhaps the most important influence on frankness lies in the relationship between the administrator of the schedule and the pupils. The pupils must have confidence in, and a friendly feeling toward, the examiner, whether teacher or psychologist. They must feel sure that their completed blanks will be kept from curious eyes and that their answers will not be used against them in any way. It is, of course, unwise to use such schedules when there is an advantage to be gained from appearing to be better adjusted than one is. Thus they should not be used on a basis for admission to an educational institution or as a basis for granting privileges, promotions, or jobs.

Summary. Despite all the limitations of adjustment schedules, they still have a definite value in aiding one's understanding of the pupil. Before reaching a conclusion about an individual's adjustment, however, it is well to compare the results with all other evidence available concerning him. The ways in

which adjustment schedules are useful in school situations may be summarized as follows:

1. For identifying some of the pupils needing special aid in adjustment. Those who need help but cannot bring themselves to answer the questions frankly will, of course, have to be located through some other means.
2. For uncovering unsuspected personal problems through noting a pupil's answers to the specific questions. The existence of such problems must then be verified through other techniques.
3. For discovering clues to the basis of the adjustment difficulty by means of a thorough analysis of the answers.
4. For confirming a suspected maladjustment of a pupil when other evidence yields inconclusive data. (A low score, however, would leave the issue undecided.)

Adjustment Schedules for Elementary School Pupils. On the elementary level, it is advisable to be even more cautious in interpreting the scores of adjustment schedules than on the levels of secondary school and college. Representative inventories for the elementary school child are Character Sketches and the California Test of Personality. Character Sketches, devised by J. B. Maller, consist of 200 items which yield scores for habit pattern, self-control, social adjustment, personal adjustment, mental health, and readiness to confide, as well as a total score. The reliabilities of the different traits range from .90 to .97. It may be used in any grade above the fourth. The pupil is asked to indicate whether he is the same or different from the person described by each item. A few of the items taken at random from the schedule are listed.

Quarrels over games, thinks only of self
Does not get tired quickly of work in which he is interested
Does not become upset easily

The California Test of Personality, Elementary Series, may be used in grades four to nine inclusive. It is divided into two parts, self-adjustment and social adjustment, and each part is

subdivided into six sections of twelve items each. The authors, Tiegs, Clarke, and Thorpe, report reliabilities of the separate sections as ranging from .60 to .87, which makes the interpretation of some of the sections of doubtful significance. The coefficients for self-adjustment and for social adjustment are relatively high, however, being reported as .90; the reliability for "total adjustment" is .93. Some of the items of which the test is composed follow:

- Is it easy for you to recite in class?
- May you usually choose your own friends?
- Do you often meet people who are so mean you hate them?
- Do you bite your finger nails often?

Adjustment Schedule for High School Students. At the high school level, grades nine to twelve. The Bell Adjustment Inventory, Student Form, is one of the most widely used instruments. It is designed to provide measures of adjustment in four areas: (a) home, (b) health, (c) social, and (d) emotional. There are forty items in each area, of which the following are samples. The letter preceding the question indicates its classification.

- a. Yes No ? Have the actions of either of your parents aroused a feeling of great fear in you at times?
- b. Yes No ? Do you frequently experience nausea, or vomiting, or diarrhea?
- c. Yes No ? Are you sometimes the leader at a social affair?
- d. Yes No ? Are your feelings easily hurt?

Only questions which differentiated between well-adjusted individuals and those selected by counselors as being poorly adjusted in the different areas were retained in the published inventory. Despite this, however, two studies⁵ have shown that the emotional adjustment scale is not very valid for college women; the other scales appear to have at least partial validity. Coefficients of reliability range from .80 to .89 for the separate areas; for the total score the reliability is .93. Scoring is relatively easy.

Adjustment Schedules for College Students. Among the adjustment schedules at the college level, the most widely used is the Bernreuter Personality Inventory. In addition to a measure of adjustment, called "neurotic tendency," it is also designed to yield scores purported to be measures of dominance, self-sufficiency, self-confidence, and sociability. It consists of 125 items of which the following are samples:

- | | | | |
|-----|----|---|---|
| Yes | No | ? | Are you easily moved to tears? |
| Yes | No | ? | Are you touchy on various subjects? |
| Yes | No | ? | Do you consider yourself a rather nervous person? |
| Yes | No | ? | Are you slow in making decisions? |

Bernreuter reports reliability coefficients for "neurotic tendency" of .91 and .88 for two classes of college students; coefficients for the other traits range from .85 to .92. Super, after a comprehensive study of the research on the test concludes that "when properly used it has some value in work with individuals." ⁶ The instrument may be scored by hand or by machine. Hand scoring is somewhat difficult without the use of a mechanical counter.

Adjustment Schedules for Adults. A recently developed (1943) inventory constructed on somewhat different principles from the other adjustment schedules is the Minnesota Multiphasic Personality Inventory. Instead of attempting to estimate tendencies, traits, or areas of maladjustment, it attempts to estimate the following clinical syndromes: hypochondriasis, depression, psychopathic deviate, psychasthenia, and hypomania. In addition, there are preliminary scales for hysteria, paranoia, schizophrenia, and masculinity-femininity.

Each scale, *e.g.*, hypochondriasis, was established by noting the way in which those patients clinically diagnosed as belonging to the syndrome answered the questions. "If 5 per cent of normal persons declare for instance, that they commonly suffer with discomfort in the pit of the stomach, whereas 80 per cent of the hypochondriacal group make the same declaration, then this is an item tending to characterize the hypochondriacal

person."⁷ Later an attempt was made to differentiate hypochondriases, for instance, from all other syndromes, but this could not be done completely. It was found that the correlation between the hypochondriacal scale and the hysteria scale among clinic patients was .71. The authors believe, however, that this is due to the fact that the hysterics and hypochondriacs have a good many symptoms in common and therefore cannot be completely differentiated. The reliabilities of the final scales based on a test-retest interval of approximately one year in a group of adults of both sexes ranged from .65 to .79 with a median of .74.⁸

The Inventory takes from one to two hours to finish and from twenty to thirty minutes to score in the manner suggested by the authors. (The time may be reduced in the individual form by eliminating the hundred-odd unscored items.) Despite the authors' statement to the contrary, it is not particularly useful below the dull normal range of intelligence. Also the phrases stated in a negative way (*e.g.*, I do not often notice my ears ringing or buzzing") require a good bit of concentration particularly for those who should respond to them with "false." In general, this inventory should be used with a great deal of caution, preferably only after a careful study of the manual⁹ and of the articles describing its construction and validation. It is particularly undesirable to acquaint subjects with diagnoses based on scores because of the large margin of error still remaining in them. In fact it is very wise to follow the authors' advice and leave interpretation to a psychiatrist or clinical psychologist.

PROJECTIVE TECHNIQUES

There are other instruments which are more revealing of personality than the inventory type because they yield a more comprehensive picture of the individual's "private world" of subjective meanings and feelings, and because, being concealed approaches, they are subject to little or no faking. Among such instruments is the Rorschach test, which consists of a series of ten ink-blot patterns which are presented to the individual

with the questions, "What do you see? What can this be?" Another, the Thematic Apperception Test, consists of a series of twenty pictures depicting dramatic events, each picture containing one person with whom the subject can identify himself. The subject is told that it is a test of creative imagination. He is asked to make up a story for which the picture could be used as an illustration and to tell the relations of the people in the picture, what their thoughts and feelings are, what has happened in the past, and what will happen in the future. Later the subject is asked whether his story was derived from something seen, read, or experienced. It is doubtful that such instruments will be widely used in schools, since they must be individually administered. A background of extensive clinical experience is required to interpret them properly, and they are as yet largely restricted to the late high school, college, and adult levels. Projective techniques such as these are, however, thought by many psychologists to offer one of the most fruitful approaches to the dynamics of personality.

METHODS OF OBSERVATION

Advantages of Observation. Observation has certain advantages over the personality test as an approach to understanding children from the practical standpoint. Even hit-or-miss incidental observation gives one a "feeling" for the child's personality that the test score or even an analysis of the responses to the individual items cannot give. Observation in a relatively "free" situation—one in which the pupil feels the absence of adult pressure—may reveal important aspects of the personality. (This possibility vanishes, however, when the pupil knows he is under observation.) Then, too, observing does not interfere with the usual school activities as testing does. Finally, one can usually see how the child responds in social situations, and note how he reacts to frustrating situations.

Limitations of Observation. Unfortunately there are many difficulties inherent in the process of observation. In addition to the fact that observation is a highly skilled technique, it is almost impossible for most teachers to spend enough time in

observing to enable them to get a well-rounded picture of the child's personality-in-action. Errors of interpretation are surprisingly easy to make. If the setting is not judged properly, or if the observer has no other knowledge of the child, misinterpretation of the meaning of his behavior is frequent. Bias, of course, on the part of the observer will vitiate the results. In many situations, too, the child, particularly the older child or adolescent, will "cover up" so as to conceal his true feelings. Finally, the same behavior at different times may not have the same meaning.

Methods of Improving Observation. Observation may be improved by keeping careful records of the behavior, preferably writing the observation down at the time or, if that cannot be done, as soon afterward as possible. It is important to pay particular attention to the setting and, if that is vague or equivocal, to forbear from recording the observation. It is also helpful to record separately the direct observation and the inference drawn from it; this makes possible a check by another person on the validity of the interpretation. Simultaneous observation with another capable person and comparison of records afterward is a good method of improving the quality and accuracy of one's own work.

For spotting children who need special aid in personality development or for noting possible change in behavior over a period of months, observation of groups may be used. In this way, also, the effect of a change in curriculum or in the program of the school can be assessed. Meaningful observation of a group of thirty or forty children is very difficult to make; thus some method of reducing the number under observation at any one time or the types of behavior to which attention is to be directed, or both, is often employed. The most successful device, as has been mentioned in an earlier chapter, is to limit one's observation to one pupil at a time, spending five to ten minutes on each. If the units of observation are too short, highly reliable but often unimportant observations are likely to be the result. If one decides to limit the type of behavior to, say, extent of social participation at a school party, small groups

may be observed in sequence. The anecdotal record or check-lists prepared in advance may be employed.

The Diary Record Method. Detailed observation of one child is usually for the purpose of comparison with other data already at hand, and to determine the kinds of situations in which he has difficulty. For this purpose a running diary account of the pupil's behavior is usually the most desirable. One should be careful to observe the child for a reasonable length of time and in a variety of situations. The elementary school child may be watched in class, on the playground, in the halls of the school, on the way home, and if possible in the home; the secondary pupil, in the home-room, in various classes, during examinations, in the study hall or library, at a club meeting, or in a school dance, in the school cafeteria, and in games or sports with his peers.

INTERVIEWING PARENTS

Value of Information from Parents. From the standpoint of diagnosis, there are two immediate reasons why parents should be seen by the elementary school teacher: to gather sufficient knowledge about a child to provide him with the most suitable educational experience, and to obtain additional insight into the causes of the behavior of the child who already has difficulties in adjustment. The same two reasons apply to the secondary school teacher as well, although the problem of contacts with the parents of the adolescent is complicated by the implied reflection on his feeling of personal worth. Information for the first of these purposes may sometimes be obtained through a questionnaire plus short contacts after school affairs or parent-teacher meetings. Although home visits are usually desirable, in most communities teachers do not have time to visit the homes of many of their pupils.

Suggestions for Conducting Interviews. When the child has shown difficulties in adjustment, it is usually advisable for interviews to be held with at least one of the parents and preferably both. This is frequently difficult to arrange, in view of the many duties of the teacher and the parent, but it usually

can be effected by some sacrifice on the part of both. The conference will be facilitated or hindered by the general attitude on the part of the parents toward the school, and by the community's conception of the role of the teacher. If the parents have a negative attitude toward the school, and if there is a common belief that the teacher's function is that of drilling on the three R's, the teacher's first job will be to establish a friendly attitude before further progress can be made. The teacher should also be alert to differences in cultural background between himself and the parent, to speak in laymen's language and yet avoid "talking down." He must appreciate that many parents resent an inquiry into their personal affairs, and in dealing with the parents of problem children he should expect to find many who will be quick to interpret innocuous comments as placing blame on them. In talking with the parents of young children he should be sensitive to a possible feeling of rivalry on the mother's part, for the teacher is often the first adult outside the family circle to have an appreciable influence on the child. Often, too, the parents feel that the school situation is the sole cause of the problem behavior and that they themselves have no responsibility in the matter. It is particularly important for the teacher to convince the parent that confidence will be scrupulously respected.

Before interviewing the parent of a "troubled" adolescent, the latter's permission should be asked in order to safeguard his status as a maturing individual. In the case of a refusal, the teacher should weigh the probable values of opposing his wishes against the possibility of gaining sufficient insight from the parents to help him. If he decides that a parental contact is imperative, he should explain the reasons for his decision to the adolescent and also indicate the general course of the inquiry he plans to follow. When the parental contact is made, the teacher must be careful not to betray confidential information the adolescent has given him. Except in extremely serious cases, revealing such information is not necessary. If the teacher finds that, for any reason, he is not progressing with the parents of a child who is definitely disturbed, he should immediately

seek the advice of the school psychological counselor. Where there is none, the services of the community child guidance clinic should be utilized.

CONFERENCES WITH THE PUPIL

The teacher may confer with the adjusted child for the purpose of getting to know him better; the troubled pupil may be interviewed in the hope that some light may be shed on the origin of his difficulty. In either case, though especially in the latter, the teacher should maintain a sympathetic-objective attitude toward the pupil. That is, he should try to appreciate the problems from the child's point of view but at the same time prevent himself from being so overwhelmed by sympathy that he adopts the child's attitudes. This process of feeling himself into the child (called empathy by some, identification by others) must be controlled and conscious to be of value. Some teachers become so emotionally involved in the child's plight (from hearing his account of it) that they adopt his attitudes toward others without realizing it, and develop such strong feelings of resentment toward the parents that they are unable to deal objectively with them. In interviewing troubled pupils, the teacher must keep in mind that confidences must be respected, take what steps he can to reduce the constraint inherent in his position of authority, and keep his own problems out of the picture.

INTEREST INVENTORIES AND ANALYSES

An interest inventory may aid the teacher in understanding the child, and, on occasion, having a child fill out a schedule of his activities each day for a week may afford some insight into the character of the life he leads. After rapport has been established with a secondary school pupil, the writing of an autobiography sometimes affords very significant information not only on formative events in the child's life but on important attitudes he holds. In the upper elementary school and in the secondary school, an analysis of the student's themes or essays may be revealing of the pupil's personality, if made by

a teacher with unusual insight into human motivation and behavior.

THE CUMULATIVE RECORD

The cumulative record which was mentioned in Chapter XVII is a means of keeping readily available permanent data about a child. These data in themselves are likely to aid the teacher in appraising the child's assets and liabilities. The record can also serve as a source of new knowledge if an analysis of the meaningful relationships among the different items is made. An especially complete record card includes spaces for the following: (1) tests—intelligence and standardized achievement; (2) marks—elementary and high school; (3) home—occupation and nationality of parents, names and ages of siblings, language spoken; (4) health—medical examination, physical development, defects, and treatment; (5) prolonged absences, with causes; (6) personality—short descriptions by teachers; (7) vocation—educational aim, vocational aim, special interests, outside employment, school activities; (8) records of conferences with pupil—important attitudes, remarks, decisions.

One can easily see how such a record would provide a valuable basis for guidance of the student in selecting courses, curricula, advanced education, and a vocational career. It is useful in understanding the maladjusted pupil chiefly as a source of clues for further inquiry. Obviously such a brief compilation of more or less objective data cannot include the type of information needed to understand the sources of, and dynamic factors in, most pupil maladjustments. Reasons for this will be clearer after the case study is described.

THE CASE STUDY

The case study is the most comprehensive of all methods of special inquiry for use with maladjusted children or with those who exhibit unusual but undeveloped abilities. Such a study is often made by a specialist, though teachers are finding an increasing need to use this device in the course of their professional work. The case study is employed in a variety of situa-

tions. It is an attempt to synthesize and interpret the material gathered by all other techniques for the purpose of making an inclusive picture of the individual and of the background factors affecting his life.

Items to Include in a Case Study. Although the amount and kind of information in any one area varies greatly in accordance with its relevance to the particular individual studied, the adequate case study will, with certain exceptions, include information in the nine areas listed below. In accordance with Allport's suggestion that "successful case studies seem naturally to fall into three sections: (a) a description of the present status, (b) an account of past influences and successive stages of development, and (c) an indication of future trends,"¹⁰ the topics have been arranged in that fashion.

<i>Present</i>	<i>Past</i>	<i>Future</i>
1. Problem	History of problem	
2. Educational status	Educational history	Educational plans
3. Intellectual status	Intellectual development	Prediction of ultimate level
4. Health and physical status	Health and physical history	Prediction of future health
5. Maturity level	Developmental history	
6. Personality	Personality development	
7. Social relations	Social history	
8. Vocation	Vocational history	Vocational plans
9. Family relationships	Family history (including home and neighborhood)	

Suggestions for specific items¹¹ in the areas must of necessity be tentative. So many variables affect the nature of the information gathered—age, sex, type of problem, to mention but a few—that inevitably some irrelevant items are included and many relevant items are omitted. An attempt has been made to be inclusive rather than brief because many case studies made by teachers and other workers in schools come to erroneous or unsure conclusions owing to the omission of items crucial to understanding the case.

Steps in Making a Case Study. Case studies usually begin with certain identifying data. These include the child's name, address, age, sex, school, grade, nationality, color, and religion.

Frequently, too, a very brief description of his physical appearance and a thumbnail sketch of his personality are included. The purpose is to orient the reader or to recall that particular child to the writer of many case studies.

The next topic covered should be the problem, but after that the order of topics depends upon the specific case investigated.

1. *Problem. Present:* For what behavior is the child being studied? Obtain specific examples. In what situations does this behavior appear? How do others (parents, teachers, etc.) conceive his problems? *History:* When was this behavior first noticed? Under what circumstances did it originally appear? How has this behavior been handled? (Frequently a most valuable clue to sources of the child's behavior may be found in the circumstances just preceding the initial manifestation.)

2. *Education. Present:* Obtain the results of most recent achievement tests. Obtain the most recent marks. What special proficiencies or deficiencies does he have? Have any diagnostic tests been given? What has been done for the child's deficiencies? What is the child's attitude toward school? Toward various teachers? Toward different subjects? What are his teachers' attitudes toward him? What is his status with his classmates? Is he ignored? Popular? Resented? What are his extracurricular activities? What is his attitude toward them? What is the relation between his home and the school? *History:* Obtain the record of child's previous marks and achievement test results. What was his age at entrance? Has he been accelerated or retarded? What was the character of his previous school adjustment? What other schools has he attended? *Future:* What are his educational plans?

(This material is primarily useful for the light it casts on frustrations in the school and for aid in determining to what extent, if any, the source of the difficulty lies in school.)

3. *Intelligence. Present:* Obtain the M.A. and I.Q. from his most recent individual test. How did he respond to the test? Were any clues to special abilities or disabilities revealed? *History:* What were the results of previous intelligence tests?

Is there a discrepancy between the results of individual and group tests? *Future:* What mental level is he likely to achieve? (The most obvious as well as the most important comparison to make is with his educational record and plans.)

4. *Health and physical condition. Present:* Obtain results of most recent medical examination. Does he have physical defects, sense organ deficiencies, glandular dysfunction, speech defects? What is his nutritional status? How does he compare with his age mates in size and strength? How does he compare with them in skill and games and sports? Is his sexual development accelerated or retarded? What is his attitude toward his health and his body? Is he overcareful or careless about his health? Does he complain about his physical condition? *History:* Obtain full record of all illnesses, including duration and severity. Has he had convulsions, influenza, infantile paralysis, encephalitis, tuberculosis, epilepsy, or chorea? Did his illness affect his behavior? Has he had serious injuries? *Future:* Can any prediction be made as to his future health?

(This material should aid in answering the question to what extent, if at all, a physical condition may underlie his problem.)

5. *Development. Present:* Is his general level of maturity above, equal to, or below that of his age mates? *History:* Was the pregnancy normal? What was the nature of the delivery? Obtain the age at which weaning, teething occurred. At what age did the child walk unassisted? At what age did he say his first word? Did interruptions occur in the development of walking and talking? At what age were bowel and bladder training started and finished? Were there special difficulties in establishing bowel or bladder control? Were rigid methods used? Were there special difficulties connected with eating or sleeping? Did child show a gradual development of self-reliance?

(This material should be compared with intelligence test results and with the material on the origin of the problem.)

6. *Personality. Present:* Obtain results of most recent personality or adjustment test. Describe his present personality. Does he have outbursts of rage, fears? Is he aggressive, submissive, shy, or bold? Does he appear to be happy or unhappy?

What strong likes or dislikes does he have? What are his fantasies, unfulfilled wishes, ambitions? What is his attitude toward himself, toward his abilities, accomplishments? Does he feel that he has a problem to solve? What is his attitude toward his parents, home, and siblings? Does he have a consistent positive or negative attitude toward adults? Does he frequently meet minor problems with evasion? *History*: What factors caused a change in his personality? What persons have been most influential as ideals? How has he responded to specific failures and frustrations?

(Material on personality from different sources should be compared. One should remember that behavior may appear to be inconsistent but when the motivation is understood, its consistency becomes evident.)

7. *Social adjustment. Present*: Does he have few or many friends? How does he get along with his peers? What is their attitude toward him? Does he take the initiative in social contacts? What social groups does he prefer? Does he belong to an out-of-school club? What are his recreational interests? *History*: How did he adjust himself to other children when younger? Were companions available? Did he prefer to play with children younger, older, or about the same age as himself?

(This material should yield an adequate description of social adjustment with his peers.)

8. *Vocational status. Present*: Does he have a job after school? How much time does it take? What is he paid? Is he doing good work? Does he like his job? Do his parents approve of it? On what does he spend his money? *History*: What jobs has he had during previous summers or after school? Obtain the same information as about his present job. *Future*: What vocation does he plan to enter? Is this his own choice or that of his parents?

(This material is especially important for vocational guidance, for comparing behavior in another regulated environment with that in school, and for yielding clues as to the suitability of his vocational choice.)

9. *Family. Present:* What is the economic and cultural level of the family? What is the social standing? What is the nature of the marital adjustment? What are the parents' personalities like? Does one parent dominate the home? Determine parents' health, religion, educational level, vocational adjustment, nature of social life, and interests. What is the nature of the parents' attitudes toward the child? Is he overprotected, rejected, unfavored? Is there anything unusual about the methods of discipline used? What attitude do the parents have toward child's school work, behavior in school? Describe sibling relationships. Describe the home, including degree of crowding, sanitation, play equipment, orderliness. Describe the neighborhood, including social, economic, and cultural conditions, standards of behavior, recreational and social facilities.

(This material should enable one to judge whether the problem originated in the home, the school, or both. In this area one is especially likely to find background material that goes a long way to explain the child's behavior.)

Assembling the Case Study Materials. In schools the best procedure in starting a case study is to assemble the information already collected on the child. The cumulative record, if available, should be consulted first. Usually it is necessary to arrange for tests as the ones on file are not likely to be recent enough. If there is the slightest indication of a physical basis for the problem, a thorough medical examination should be made. The usual medical examination by the school physician is almost certain to be too superficial to be of much use. Interviews should usually be held with the parents, and the child should be observed in as many situations as can be arranged. Interviews with the child are essential, as only through this means can one establish the type of relationship necessary for understanding the problem and aiding readjustment.

Reaching a Diagnosis. After the material considered pertinent is gathered, there must be an attempt to synthesize it by comparing the information in the different sections and interrelating it. The purpose is to make a diagnosis, which may be

defined as a description of the maladjustment together with the causative factors in both the past and present. The process is exceedingly difficult; it frequently happens that even when the expert draws on all the psychological and social knowledge at his command he still finds that the case remains unexplained. Certainly the teacher in attempting a diagnosis must use the knowledge of his own motivation and his experience with others, taking what precautions he can against his own bias.

As a means of aiding the teacher in solving this difficult problem, the Department of Public Adjustment in the Des Moines Schools¹² and the Psychological Clinic of the Detroit Public Schools¹³ have published objective case history outlines which incorporate systems of ratings by which each item in the case history may be assigned to a position on a five-point scale. Both scales appear to differentiate very well, on the basis of total score, between groups of problem and nonproblem children and undoubtedly show to some extent the degree of seriousness of the maladjustments of different children. Nevertheless, neither scale can be considered the answer to the problem of case evaluation and diagnosis. In addition to the practical difficulty in assigning complex factors to positions on a scale and the inherent error of the automatic weighting of different areas by the number of items contained therein, such systems of rating cannot deal sufficiently well with the all-important interrelationship between the factors. Whether or not one of these systems of ratings is used, it is always helpful to summarize what appear to be the outstanding findings from the case study and to make a tentative plan for treatment.

Preventive Measures. All the methods of approach to understanding the child, discussed in this section, constitute at the same time an opening for the prevention of maladjustment. It is through such methods that the teacher can acquire the knowledge of the child's particular assets and liabilities and of the factors at the basis of his difficulty which are indispensable to the proper use of corrective procedures. General prescriptions for handling children's problems must be of limited value; only

the person who understands the specific child can judge whether or not the suggested method of handling is wise or unwise.

**THE ROLE OF THE TEACHER AND THE SPECIALISTS
IN AIDING THE ADJUSTMENT AND READJUSTMENT OF THE CHILD**

The teacher's role in the readjustment of the maladjusted school pupil must be more limited than that of the psychological counselor. This is no reflection on the teacher but is primarily a product of differences in training and of function. The counselor may be expected to have a better insight into his own motivation and problems as well as a more complete knowledge and understanding of the personalities of others. He is expected to have a much more extensive knowledge of diagnostic and treatment techniques and consequently a greater feeling of self-confidence in dealing with serious problems. Finally, he is expected to have more time for treatment through interviews than does the teacher. In general, the teacher, working unaided, limits himself to the less serious, more easily treatable maladjustments.

The psychological counselor has his limitations also. Usually he does not have time for sufficient observation of pupils in their everyday activities or for prolonged treatment of the children in need of it. Also, his knowledge of diagnostic and treatment techniques is almost inevitably less broad and deep than the combined knowledge of the psychiatrist, psychologist, pediatrician, and social worker who work together in a child guidance clinic. The middle range of problem difficulty would appear to be his province when working unaided.

THE EVALUATION OF THE SERIOUSNESS OF MALADJUSTMENTS

If it is advisable for the teacher to concern himself mainly with the less difficult maladjustments, the psychological counselor, with those in the middle range of difficulty, and the child guidance clinic with the most serious ones, it becomes necessary to be able to evaluate the seriousness of maladjustments. This evaluation should be made on the basis of a complete case

study and is best done by the assemblage of teachers, principal, counselor, and other specialists known as the school case conference. Whether or not the case conference makes the decision, a number of factors must be taken into account before it can be wisely made.

Area and Duration of the Maladjustment. The first factor is that of *area*. To what extent does the maladjustment extend into the different spheres of the child's life? For example, if a child is timid at school while at home and in the community he is a normal, active youngster, the chances are great that the problem is relatively superficial and will respond well to treatment. If, on the other hand, the child is timid and fearful in all spheres of activity, the desired change in his personality will not be so easy to effect. A second factor is the *duration* of maladjustment. In general, if a problem has only recently appeared, it is more easily dealt with than if it has existed for a long time. An exception to this generalization, however, may be the child who is subjected to a traumatic experience which results in a drastic change in his personality.

Resistance to Modification. Resistance to attempts at modification is a third factor. If apparently reasonable techniques of treatment in the past have not improved the child's adjustment, the problem is likely to be more serious than one in which treatment has produced some degree of favorable change. Subsidiary to this factor is the underlying attitude of the child toward a change in his situation. If his present problem along with its discomforts is nevertheless bringing him satisfactions which he is loathe to give up, the chances of improvement are poor. And if substitute sources of satisfaction are not available for the child, intensive treatment is definitely indicated.

Depth and Nature of Symptoms. A fourth factor is that of *depth*. This refers to the intensity of the child's feelings. If he shows extreme hatred toward people or feelings of utter worthlessness and helplessness rather than a mild feeling of occasional resentment or inadequacy, he is likely to require lengthy and intensive treatment. One should also consider the nature of the symptoms. Some symptoms are not indicative of the degree of

the seriousness, but others—phobias, compulsions, panic states, or complete withdrawal from social contacts, as well as those based on epilepsy, juvenile paresis, encephalitis, or head trauma—betray the presence of grave maladjustments.

The Type of Treatment. A final factor is the *type of treatment apparently required*. Frequently, of course, this cannot be foretold with exactness. In general, one may say that maladjustments subject to environmental manipulation are less serious than those requiring a change in fundamental attitude on the part of the child or parents (e.g., an attitude of rejection), or ones that require a combination of medical and psychiatric treatment.

The Province of the Teacher and Specialists in the Treatment of Maladjustments. The factors concerning maladjustments important to consider in evaluating seriousness, susceptibility to treatment and allocation to the province of the teacher, psychological counselor, or child guidance clinic may be summarized as follows:

	<i>Teacher</i>	<i>Psychological Counselor</i>	<i>Child Guidance Clinic</i>
Area	One or few	Few	Many
Duration	Short	Medium	Long-standing
Resistance	Slight	Fairly resistant	Quite resistant
Depth	Superficial	Moderate	Profound
Symptoms	Common	Less common	Neurotic or pre-psychotic
Treatment	Mainly environmental	Environmental and direct	Direct and medical

AIDING THE ADJUSTMENT AND READJUSTMENT OF THE CHILD

The teacher in a school lacking psychological counselors or other guidance workers can nevertheless do a great deal in aiding the adjustment and readjustment of the child. In the following section, certain suggestions will be made for dealing with different types of problems. It should be stated at the outset, however, that many of the suggestions call for a careful application; they are not a substitute for treatment based on an intimate knowledge of the specific child involved.

accomplishment makes him feel important. Special arrangements may also be made for him to utilize and display any special abilities or talents he has, or it may be possible for him to receive special instruction to help him become unusually proficient in some motor skill, as was suggested in Chapter III. In general, the more opportunities he has for legitimately receiving attention and recognition by the teacher and his classmates, the less he will resort to annoying, attention-getting behavior. Every encouragement should be given him in his own efforts to reach socially approved goals. The teacher's own praise, reassurance, and acknowledgment of his personal worth usually aid greatly.

Aiding the Poverty-Stricken Child. The child from a poverty-stricken home frequently suffers from poor health and malnutrition. One of the first requirements is, therefore, a physical examination and an endeavor to meet his nutritional needs. Hunger often shows itself in school through irritability, malnutrition through apathy. Both conditions are aided by the provision of school lunches; in addition, some schools find it advisable to serve milk in the middle of the morning or even before classes begin. The problem presented by his clothing requires especially tactful handling. It is likely to be dirty, threadbare, ill-fitting, and, of course, a source of embarrassment to the child. Some teachers find a way to give decent clothing to a child's family without offense; others rely on social agencies. In any case, the possession of clothes which do not set the child apart from others is likely to make an immediate difference in his morale.

These measures, worthy though they be, are merely palliatives designed to make somewhat more bearable the plight of children who are the innocent victims of economic deficiencies in our society. The best school will have a difficult, sometimes an impossible task, in attempting to correct personality difficulties deeply rooted in condition of poverty.

Aiding Children with Unfavorable Parent-Child Relationships. Rejected children constitute problems which are very likely to be beyond the scope of the teacher. Even child guid-

ance clinics with expert staffs find these children to be most difficult to readjust, especially when both parents reject the child. The parents' attitudes in such cases are likely to be firmly embedded in their personalities. The best chance for improvement lies in intensive treatment; thus, if there is a child guidance clinic in the community, such children should be referred to it. If there is but one rejecting parent, it is sometimes possible for a teacher, through a judicious approach, to persuade the nonrejecting parent to be more affectionate with the child. The teacher himself, as was suggested in Chapter IV, may attempt to meet partially his need for affection. Such measures sometimes help to improve the child's behavior.

Thoroughgoing overprotection is also a difficult condition for the teacher to cope with. With mild cases, the same techniques that succeed with the shy child are likely to be beneficial. A concurrent attempt to gain the parents' cooperation in granting the child more independence in his out-of-school life should be of value. In severe cases, referral to a child guidance clinic is usually indicated.

The child who is unfavored in the home is usually less resistant to the readjustive efforts of the teacher. Sometimes these children respond to techniques designed to bolster their self-esteem and individuality by coming to look on the school as a source of security, even if no change in parental attitude can be effected. Children from hypermoral or immoral homes are harder to help. The hypermoral parent is practically certain to be convinced of the correctness of his point of view and practices. The most the teacher is often able to do is to point out to the child, when unnecessary moral conflicts arise, that other people have different positions on the matter. It is obviously unwise to oppose the ideas of the parents. The immoral home is within the province of the family welfare agency rather than that of the school. If a referral to such an agency can be arranged, the child's plight may frequently be improved.

Reducing Classroom Friction. It is easy to see how the behavior of many maladjusted children is annoying and disturbing to the teacher and to the class. But when teachers respond

to misbehavior by scolding, nagging, sarcastic remarks, ridiculing, shaming, forcing an apology, threatening, detention after school, assignment of extra work, lowering marks on subjects or tests, nonpromotion, demotion, or corporal punishment, they are likely to defeat their purpose by increasing the frequency of the undesirable activities.¹⁶ When one teacher, however, understands the child's problem and can interpret it to the others and gain their cooperation, a definite improvement is frequently seen. At times it may be necessary for a teacher to suggest that a child be placed under the supervision of another teacher, for there are some children who, for unknown or unconscious reasons, are incompatible with certain adults.

Using Outside Agencies. Every teacher should know the resources in the community for aiding children. Not only should she acquire knowledge obtainable through annual reports and other descriptive literature, but she should also visit the agencies more likely to be serviceable. She should be well oriented to the services performed by family welfare and children's agencies as well as by child guidance clinics and health and recreational centers.

SUMMARY

Various techniques of approach to a better understanding of the individual child are available to the teacher.

Adjustment schedules, despite their imperfections, may be used for (1) identifying some of the children in need of special guidance, (2) uncovering unsuspected personal problems, (3) getting clues to the factors underlying the maladjustment, and (4) confirming a suspected maladjustment.

Observation may be used to advantage in understanding the child's personality-in-action in everyday situations.

Information from parents may be of great value in understanding the background of the child and the extraschool influences on his personality development.

Conferences with the pupil afford insight into his feelings and attitudes, and establish the relationship necessary for further work with him.

The cumulative record affords a picture of the child's assets and liabilities as well as leads for further investigation.

The case study is the most comprehensive of all methods. It is best employed in the case of maladjusted children who cannot otherwise be easily diagnosed and treated.

The teacher's role in aiding adjustment and readjustment in a school which has the services of a psychological counselor and access to a child guidance clinic is best restricted to cases which (1) involve few areas in the child's life; (2) are of short duration; (3) have previously been responsive to treatment; (4) are of relatively superficial depth; (5) include only frequently encountered symptoms; and (6) are likely to respond to environmental treatment.

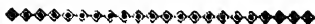
In the absence of a psychological counselor and child guidance clinic, a teacher may frequently improve the adjustment of children who are physically handicapped, sickly, sensory-defective, gifted, scholastically handicapped, shy or isolated, "inferior," or poverty-stricken. It may also aid in the adjustment and readjustment of the child unflavored by his parents. He is likely to find rejected, overprotected, and seriously delinquent children as well as children who come from hypermoral or immoral homes beyond his scope.

A great deal of classroom friction can be reduced by the use of proper methods, and difficult cases may be greatly benefited by referral to the appropriate outside agency.

QUESTIONS AND EXERCISES

1. "If adjustment schedules cannot accurately assess the degree of adjustment of every member of a class, they should not be used in the school." Discuss the merits and demerits of this statement.
2. How may the teacher improve his technique of observation?
3. What information is it helpful for the teacher to have before making contact with the parents of a child?
4. What sources of friction should the teacher be aware of in dealing with the parents of a maladjusted child?

CHAPTER XXII



THE MENTAL HEALTH OF THE TEACHER

Much of the material presented in the last three chapters has a direct or indirect bearing on the mental health of the teacher. The strength, if any, of his hereditary predisposition to mental disorder; the nature of his bodily constitution; the type of experience furnished him by the family, community, and school during childhood; even the extent of his understanding of the pupils and the methods he uses in aiding children with their personality and behavior difficulties influence his mental health. The types of frustration he meets in his daily life and the efficacy of the methods of tension reduction he uses also have a great deal to do with his present adjustment.

In this chapter, we shall first consider the teacher as an adult who is affected like any other adult by the satisfactions and dissatisfactions embedded in the American culture. A description of characteristics typical of different life phases will be presented in order to afford the teacher a basis for comparison with his own life. The special problems which the unmarried man and woman must face will be dealt with separately because of the greater difficulty of their adjustment problems. We shall then turn to a consideration of the factors conducive to mental health and sources of dissatisfaction specifically connected with the teaching profession, and finally to ways of improving the mental health of teachers.

THE TEACHER AS ADULT

The Effect of the American Culture on Mental Health. The naive belief that mental health is independent of the nature of the social order and the culture is slowly dying. Becker has stated: "... successful adaptation to life implies a successful

and well adapted social order; nothing can be more fallacious than the interpretation of mental health in strictly individualistic terms. Positive mental health is but the personal aspect of a society in which personal and social values are in right relation to each other and are attainable by everyone within the limits of his biological capacities." ¹

It is unnecessary to describe in detail the great variety of satisfactions inherent in the American culture today. The undisputed fact that very few inhabitants of the United States who are intimately familiar with other countries would willingly live elsewhere is sufficient testimony to the relative wealth of satisfactions existing here. The lack of rigidity in customs found in many parts of the United States allows for the expression of a wide variety of individual preferences. The large number of socially useful occupations allows vast numbers to achieve great satisfaction in the service of mankind. The unexcelled educational opportunities, the relative fluidity of class lines, and the strong democratic tradition are among the chief conditions which tend to provide a mentally healthful environment.

On the other hand, the fact that our culture contains many imperfections cannot be overlooked. Watson calls attention to the fact that "many of the conflicts experienced by children, adolescents, and adults as personal and individual, have their origin in a social order which has not yet been planned with human welfare as a primary consideration." ² And Otto Fenichel, an authority in the field of psychoanalysis, states that "... very often the fulfillment of the basic demands of mental hygiene depends on prerequisites that cannot be provided by mental hygiene. Would it not be the just task of such a mental hygiene to provide work, bread, and satisfaction of the basic needs for everybody?" ³

The Effect of Contradictory Values on Mental Health. One of the best statements concerning the contradictory values inherent in our society which increase the difficulty of adjustment is made by Horney:

The first contradiction to be mentioned is that between competition and success on the one hand and brotherly love and humility on the other. On the one hand everything is done to spur us to success, which means that we must be not only assertive but aggressive, able to push others out of the way. On the other hand we are deeply imbued with Christian ideals which declare that it is selfish to want anything for ourselves, that we should be humble, turn the other cheek, be yielding. . . .

The second contradiction is that between the stimulation of our needs and our factual frustrations in satisfying them. For economic reasons needs are constantly being stimulated in our culture by such means as advertisements, "conspicuous consumption," the ideal of "keeping up with the Joneses." For the great majority, however, the actual fulfillment of these needs is closely restricted. The psychic consequence for the individual is a constant discrepancy between his desires and their fulfillment.

Another contradiction exists between the alleged freedom of the individual and all his factual limitations. The individual is told by society that he is free, independent, can decide his life according to his own free will; "the great game of life" is open to him, and he can get what he wants if he is efficient and energetic. In actual fact, for the majority of people all these possibilities are limited. What has been said facetiously of the impossibility of choosing one's parents can well be extended to life in general—choosing and succeeding in an occupation, choosing ways of recreation, choosing a mate. The result for the individual is a wavering between a feeling of boundless power in determining his own fate and a feeling of entire helplessness.⁴

To her list of culturally imposed conflicts must be added two more whose effect on mental health is important. First there is the still predominant cultural attitude toward sex which refuses to concede the normality of strong sexual feelings in the young unmarried person but expects the wedding ceremony to remove the previously acquired inhibitions and ensure, immediately and permanently, satisfactory marital rela-

and well adapted social order; nothing can be more fallacious than the interpretation of mental health in strictly individualistic terms. Positive mental health is but the personal aspect of a society in which personal and social values are in right relation to each other and are attainable by everyone within the limits of his biological capacities." ¹

It is unnecessary to describe in detail the great variety of satisfactions inherent in the American culture today. The undisputed fact that very few inhabitants of the United States who are intimately familiar with other countries would willingly live elsewhere is sufficient testimony to the relative wealth of satisfactions existing here. The lack of rigidity in customs found in many parts of the United States allows for the expression of a wide variety of individual preferences. The large number of socially useful occupations allows vast numbers to achieve great satisfaction in the service of mankind. The unexcelled educational opportunities, the relative fluidity of class lines, and the strong democratic tradition are among the chief conditions which tend to provide a mentally healthful environment.

On the other hand, the fact that our culture contains many imperfections cannot be overlooked. Watson calls attention to the fact that "many of the conflicts experienced by children, adolescents, and adults as personal and individual, have their origin in a social order which has not yet been planned with human welfare as a primary consideration." ² And Otto Fennichel, an authority in the field of psychoanalysis, states that "... very often the fulfillment of the basic demands of mental hygiene depends on prerequisites that cannot be provided by mental hygiene. Would it not be the just task of such a mental hygiene to provide work, bread, and satisfaction of the basic needs for everybody?" ³

The Effect of Contradictory Values on Mental Health. One of the best statements concerning the contradictory values inherent in our society which increase the difficulty of adjustment is made by Horney:

The first contradiction to be mentioned is that between competition and success on the one hand and brotherly love and humility on the other. On the one hand everything is done to spur us to success, which means that we must be not only assertive but aggressive, able to push others out of the way. On the other hand we are deeply imbued with Christian ideals which declare that it is selfish to want anything for ourselves, that we should be humble, turn the other cheek, be yielding. . . .

The second contradiction is that between the stimulation of our needs and our factual frustrations in satisfying them. For economic reasons needs are constantly being stimulated in our culture by such means as advertisements, "conspicuous consumption," the ideal of "keeping up with the Joneses." For the great majority, however, the actual fulfillment of these needs is closely restricted. The psychic consequence for the individual is a constant discrepancy between his desires and their fulfillment.

Another contradiction exists between the alleged freedom of the individual and all his factual limitations. The individual is told by society that he is free, independent, can decide his life according to his own free will; "the great game of life" is open to him, and he can get what he wants if he is efficient and energetic. In actual fact, for the majority of people all these possibilities are limited. What has been said facetiously of the impossibility of choosing one's parents can well be extended to life in general—choosing and succeeding in an occupation, choosing ways of recreation, choosing a mate. The result for the individual is a wavering between a feeling of boundless power in determining his own fate and a feeling of entire helplessness.⁴

To her list of culturally imposed conflicts must be added two more whose effect on mental health is important. First there is the still predominant cultural attitude toward sex which refuses to concede the normality of strong sexual feelings in the young unmarried person but expects the wedding ceremony to remove the previously acquired inhibitions and ensure, immediately and permanently, satisfactory marital rela-

tions. Second, the conflict between the American doctrine of social equality and the practice of discrimination against certain races and minority groups condemns millions of individuals to an over-large share or frustration in life.

In general, teachers face many of these culturally embedded handicaps to good adjustment to much the same degree as other adults of similar socioeconomic status. Some may not have suffered these conflicts personally, but most teachers are in a position to observe human relationships constantly, to recognize discrimination, and to suffer vicariously with those whose adjustment is made more difficult by such handicaps. On the other hand, the teacher has an unusual opportunity both to aid in the alleviation of personal conflicts in pupils and to assist in community enlightenment.

Characteristics Typical of Different Life Phases. The problems of adjustment for the individual teacher tend to vary in the course of the years as the teacher enters new life phases. The discussion of this topic and of those immediately following is based chiefly upon an analysis of 200 life histories made by Charlotte Buhler and reported along with related studies by E. Frankel.⁵ *As the majority of the subjects were middle class and professional people*, it affords material which has a definite bearing on the lives of teachers. The extensive data summarized by Elliott⁶ are also drawn upon.

The first phase—the years of childhood. Buhler divides the life span into five phases. Since the years of childhood, which constitute the first phase, have been treated at some length in Chapters II to VI, it will not be discussed further here. We shall proceed with the second phase.

Second phase—ages fifteen to thirty. This period is characterized by great increases in growth, ability, strength, and vitality. It combines preparation for an active but tentative step out into independent living; the dominant attitude being forward-looking and exploratory. Self-chosen and independent activities are entered into, and interests tend to center around sports, travel, literature, philosophy, art, and religion. The peak of the sex urge is reached, and heterosexual interest increases

until it reaches its culmination in marriage. Great satisfaction is gained through engaging in a variety of interesting activities and in increasing proficiencies of many kinds. Both problems and satisfactions center around (1) emancipation from the home, (2) achievement in school and vocation, (3) finding a way to live a socially significant life, (4) social relations with peers and adults, (5) heterosexual adjustment, and (6) acquiring an adult status.

Third phase—ages thirty to forty-five. This is the culmination period of life, usually the most fruitful in professional and creative work. A certain stability is desired which is fulfilled through settling down and staying in one place, making the final choice of vocation and working hard in it. For both husband and wife, responsibilities are increased and social activities are at their height; the affectional needs are fulfilled mainly by the spouse and children, and emotional ties with the parents become definitely weaker. The man's self-esteem is largely bound up with his progress in his vocation and the woman's with the career of her husband, the development of her children, climbing the social ladder perhaps, and with her own career, if any.

The married woman who has centered her life around the family routine with the consequent neglect of outside interests may find the latter part of this period very trying. She may come to realize that her previously latent desire to be recognized as a person is unlikely to be satisfied; thus she feels keenly the lack of a career. As a result she may unduly prolong the period of protective care of her children. The married woman with a career, even though she gains satisfaction from being recognized as a person in her own right, often is distressed by the conflicting demands on her time and energy caused by the dual responsibility.

Fourth phase—ages forty-five to sixty. Biologically, this period marks the beginning of regressive growth, when no further regeneration of cells occurs and injurious cell changes are likely to increase. Health problems become more frequent, and many in this group become physically impaired to some

degree. The man's work usually involves just as many activities and frequently greater responsibility, but he tends to decrease the number of his other activities. This is the period when the man is most likely to look with an overly critical eye at himself and his life. Because of the cultural overvaluation of attaining preeminence, he is likely to find that his degree of success and income are disappointing. Men in rapidly changing occupations are likely to find it difficult to keep abreast of the advancing knowledge required, and they may feel keenly the competition of younger men.

Women usually go through the climacteric during the first part of this period, although it comes to some as early as age thirty-five. For many women at this time, the emotional threshold is lowered with a consequent increase in emotional outbursts and tears. Often there is a feeling of tenseness, a vague yearning, moodiness and depressions. Such feelings are not, however, a necessary accompaniment of the menopause. Women who realize that the glandular changes do not affect their femininity and who are treated with consideration by others may find the period not unusually difficult.

During this period both husband and wife must loosen the affectional bonds with their children and see them leave the home. The satisfaction in observing the progress of their children still remains, however, and the coming of grandchildren increases their pleasure. Although long-held goals are likely to diminish in attractiveness, great pleasure is gained from a revival of interests characteristic of the second phase.

Many succeed in reaching a true fruition in this period. They have become self-confident through many years of successful coping with life's problems and have become serene, looking forward happily to life's future rewards. Their greatest satisfactions come from their friendships and from their services to others.

Fifth phase—age sixty and over. Although the inevitable restriction of activities, more frequent physical illness, and weakening of the body which characterize this period involve rather difficult adjustments in themselves, the difficulties are in-

creased by the fact that the social order has made little provision either for the welfare or proper utilization of the abilities of people in this phase. Vast numbers of persons during this period are capable of giving excellent advice and guidance to younger people, but their services are not frequently sought. Younger people are likely to undervalue their capacities just as they themselves undervalued the abilities of their adolescent children. Near the end of the period they desire a quiet life where they can cultivate their hobbies and avocational pursuits, reminisce, have visits with their children, and give advice and consolation.

Special Problems of the Unmarried Man. The bachelor's life is not all problems, of course; his status even yields him certain advantages over his married compeer. He is barred from few occupations for lack of a wife and is preferred in some. He can devote his financial resources mainly to himself and is able to indulge in more of the gratifications that money will buy than is the married man.

The maintenance of social relationships usually constitutes a major problem in his life. As he grows older and year by year more of his friends become married he may find himself becoming a "fifth wheel" at social affairs. In an effort to increase his social contacts, he frequently joins new clubs and organizations and becomes an active member in all. He is likely to make a real effort to retain the friendships he has already established. He is also likely to envy the friends who married interesting and attractive girls and wonders whether he should not have married (or regrets that he did not keep trying after being turned down). But by the age of forty or so, he is likely to have become rather inflexible in his manner of life, and the realization that marriage would involve many changes in his habits tends to reinforce his original motive for remaining single.

The sexual problem of the unmarried man is extremely difficult to solve since there is no socially sanctioned means of releasing sexual tension, and whatever solution he finds is likely to be an inadequate substitute for married life. Only recently have studies been made on the sex life of the older unmarried

man.⁷ Although there are no statistics available, it is believed that some are able to reduce sexual tension through sublimatory activities. However, as was pointed out in Chapter XIX, sublimation alone does not constitute a solution to the problem. The diminishing intensity of the sex urge after about age twenty-five, however, does make the problem of the older unmarried man less acute.

Special Problems of the Unmarried Woman. The adjustment problems of the unmarried woman are, of course, more difficult to solve than those of the single man. It is usually assumed that the bachelor made a voluntary choice of single blessedness, but such an assumption is less readily made in the case of the single woman. This is likely to have a somewhat depressing effect on the woman's self-esteem.

One of the frequent problems of single women is the maintenance of friendly relations with men. Because she is likely to feel more keenly the cultural overvaluation of men, and to appreciate more fully the sex discrimination still lingering in the mores, she may tend to reject the feminine role and enter into excessive competition with men.

The single woman who pushes sex and maternal interests into the background and concentrates all her energies on her job may merely postpone coping with a life problem. About the age of thirty to forty she may find herself in a situation which parallels that of the married woman who has neglected and postponed her desire to be recognized as a person. While the wife and mother longs for a career, the unmarried woman who has made a success of her vocational life is likely to long for marriage. She realizes that her chances to marry (she had perhaps always felt she would get around to marriage in time) are diminishing rapidly and that the biological possibility for motherhood may soon be lost. Consequently she may feel more than usually inadequate and lonely, and her love needs, because of her previous neglect, may assume an exaggerated value.

The sexual problem of the unmarried woman is compli-

cated by the fact that her sexual needs are typically subordinated to her affectional needs. Because of this, the mere physiological release of tension is less satisfying to her than to the man.⁸ The confluence of the affectional and sexual needs, however, make it easier for the woman to utilize the various forms of partial release discussed in Chapter XIX under the heading of sublimation. The establishment of a close permanent friendship with a single woman of similar age and interests affords a fairly adequate solution for many.

It should, of course, not be assumed that marriage solves all of a woman's problems and adds none of importance. Many unmarried women are, in general, very happy and well adjusted, and many married women are not. Either status produces sources of satisfaction and security as well as specific problems and difficulties. It is the purpose of this chapter to consider primarily the latter.

THE TEACHER AS TEACHER

In discussing the mental health of the teacher as a member of the teaching profession, we shall not be concerned with (1) women teachers who enter the profession as a stop-gap until marriage or until they find other work, with a consequent lack of real interest in their jobs; (2) those who have no real affection for, or interest in, children, but who drift into teaching because of a chance vocational opportunity; (3) those who desire a job in which a minimum of effort is expected and who have the mistaken impression that teaching fulfills that requirement. We shall be concerned with those who have a warm interest in children and in the profession. Even among these, however, we must recognize that great individual differences exist in suitability for the work. Before the teacher steps into his first classroom his personality has been affected for better or worse by the adjustment factors discussed previously. In addition to influences from the past, the satisfactions and dissatisfactions he finds in his specific job will raise or depress his general level of happiness and efficiency.

**ASPECTS OF
TEACHING CONDUCTIVE TO MENTAL HEALTH**

The following aspects of teaching are listed in a recent National Education Association research bulletin as conducive to mental health: “. . . teaching: (1) is socially useful work, (2) involves a continuous series of challenging new problems, (3) encourages creativeness, (4) provides opportunity for self-analysis, (5) stimulates broad interests, (6) requires an unusual amount of self-control, (7) affords an unexcelled opportunity for growth, and, generally speaking, (8) is done amid surroundings that are relatively pleasant and comfortable.”⁹ Bagley and Keith,¹⁰ after mentioning some of the same items, call attention to the beneficial effect on the teacher of the buoyancy, hope, and enthusiasm of youth and to the sense of personal significance engendered by being in a position to influence public policy through the presentation of well-considered statements on community, state, and national issues.

Perhaps all experienced teachers would agree that most if not all the aspects mentioned are definitely positive factors in providing a satisfying and fruitful vocational life. There might be a possible objection to the inclusion of advantages (2) and (6) in the National Education Association list. “A continuous series of challenging new problems” will in most instances stimulate and liven the teaching process, yet if they be too challenging they may overwhelm the teacher. That teaching “requires an unusual amount of self-control” no one would gainsay, but there is a real question as to whether the demands of the situation result in the development of a better integrated personality or whether the constant expenditure of energy necessary for keeping calm so much of the time is not a slightly disintegrating factor. It may well be that this aspect of the work increases the teacher's need for restorative and recreational activities outside of school hours.

The Social Significance of Teaching. Perhaps the greatest satisfaction in teaching comes from the knowledge of the socially significant character of the work. Few occupations afford

such a genuine opportunity for influencing the lives of individuals in such a favorable and wholesome way. Perhaps there is no occupation more fundamental to the functioning of our democratic society, through its effect on the knowledge, information, and attitudes of the future adult citizenry.

The Opportunity for Merging One's Interests With Those of the Group. Another satisfaction, allied to the first, results from the ease with which the teacher can merge his interests with those of his group of pupils. To work for the interests of others in an unselfish and effective way brings a type of complete satisfaction which pursuits ministering directly to the self-interest of the teacher cannot duplicate.

Creativity, Stimulation of Interests, and Opportunity for Growth. The creativity, the stimulation of broad interests, and the opportunity for growth afforded by teaching are aspects which can hardly be separated. When teaching is compared with the skilled trades, the reality of these factors becomes immediately evident. It is true that many carpenters, for example, can fulfill to some extent their creative desires, but opportunities for the development of broad interests and growth are hardly an integral part of the job itself. Nor does teaching suffer in comparison with the professions of law, engineering, medicine, or even the ministry.

Affection, Self-Esteem, and Independence. Teachers have many opportunities for developing wholesome affectionate relationships with their pupils. By this is not meant the selection of a "teacher's pet" or the lavishing of affection on children; but rather the warm sympathetic mutual regard which is a positive mental health influence on both teacher and pupils. Self-esteem is favorably affected by the respect and admiration of pupils and parents, perhaps reaching a high point when former students return for a visit. The knowledge of doing a good job is, in itself, a favorable factor in the maintenance of self-esteem. The independence in choice of methods for the presentation of material, and the knowledge that one is not a mere cog in a machine, are also sources of great satisfaction.

There are a host of specific satisfactions which cannot even

be mentioned in this summary treatment of the topic. The list might include the pleasure of observing a pupil successfully meeting a problem, the joy in the evidence of an alert appreciation of ideas, and many other satisfactions. But teaching, of course, is not entirely a succession of triumphs and unalloyed pleasure; it has its darker aspects as well. These aspects will now be discussed with an indication, wherever possible, of the frequency with which the undesirable condition is encountered. Unfortunately, there are a good many points upon which statistical data are not yet available, and where it is necessary to substitute the opinions of authorities.

SOURCES OF DISSATISFACTION IN TEACHING

According to a recent research bulletin of the National Education Association, the following factors contribute to the personal maladjustment of the teacher: ". . . (1) overpressure of required work, (2) underpay, (3) insecurity of tenure, (4) constant sharing of the burdens of others, (5) puritanic restrictions on out-of-school activities, (6) repressive, autocratic administration and supervision, (7) aloofness on the part of the general public, (8) necessary attention to numerous details, and (9) the constant association with immature minds." ¹¹

Pressure of Required Work and Attention to Numerous Details. Many adults, particularly those who have had little experience with children or classrooms, think that teaching is an easy life. According to McAndrew, "editors, salesmen, business women, everybody look at our short hours, Saturdays off, long vacations, pleasant surroundings, and stable tenure, with a smile for every bid to pity the downtrodden teacher." ¹²

As if in answer to this statement, Bagley and Keith say: "The actual work of teaching, it is true, involves relatively short hours as compared with some other occupations, but both the short day and the short week are more than counterbalanced by two other factors: (1) the need of constant, relentless, unremitting concentration throughout the school day; and (2) the multiplicity of necessary tasks and duties that can be accomplished only outside of school hours." ¹³ According to

Averill, "... the invariable routine of lesson planning, problem construction, motivation of work, judgment of performance, diagnoses of weaknesses, application of remedial instruction, and integration of the various parts of the program into a coherent and related whole, is a taxing responsibility which every teacher assumes when she becomes the leader of forty-odd children . . ." ¹⁴

The significance of this factor in tending to produce mental disorder in the teacher depends to a large extent on how great is the pressure in the specific school and classroom. No one can say without knowledge of the concrete situation, but that overpressure is fairly widespread is indicated by the findings of the Commonwealth Teacher Training Study ¹⁵ that teachers must perform 1,001 separate tasks in discharging their functions. Another source of evidence is found in what the teachers themselves think about the heaviness of their duties. Approximately 40 per cent of elementary school teachers and 47 per cent of high school teachers consider their total professional loads as "unduly heavy or extreme." ¹⁶ Even when some exaggeration is allowed for, it would seem that it is not uncommon for teachers to be overburdened with work. These findings are also in agreement with those of Peck, ¹⁷ who asked 100 teachers attending summer school to mention in an unsigned statement the conditions of teaching which they felt to be sources of maladjustment in their own lives. Heavy teaching load was mentioned by 49 per cent, the highest percentage found in the study.

Inadequate Salaries. From 1918 to 1945 teachers' salaries in terms of purchasing power have been gradually and rather steadily rising. In terms of 1935-1939 dollars, the average salary during these years has risen from \$624 to \$1,457 (estimated). ¹⁸ The figures for the last few years are not available as yet. Because of the sharp rise in income taxes necessitated by the war, however, "we find in 1946-47 that on the average, city teachers have less purchasing power than they had in 1940-41." ¹⁹ In 1946 the average teacher's salary was estimated to be \$2,033 in inflated dollars. ²⁰ This *average* salary is, of course, far below a figure consistent with the responsibilities of the teacher

and makes a striking contrast to the *minimum* salary of \$2,645 paid to those in the lowest professional grade in the classified service of the Federal government.

Of course, national averages cannot reveal the range of salaries received. Teachers in large urban communities are relatively well paid; in 1946-47 they received in cities of over 100,000 population an average of \$2,696 for kindergarten teaching and an average of \$3,593 for high school work.²¹ The salaries of rural teachers, on the other hand, are so low as to constitute a national disgrace. In 1940, the average salary was \$830.²²

The conclusion from these figures must be that hundreds of thousands of teachers are unable to save for emergencies or for retirement; large numbers must constantly engage in a series of petty economies, and some are in actual want. Not only does this situation keep highly desirable young people from entering the profession, it also subjects thousands of teachers to worry and strain. Although it is gratifying to find that every state now has a state-wide retirement or pension plan,²³ the teacher's worry over providing for her inactive years is not eliminated because of the rise in the cost of living. Retirement sums deemed adequate only a few years ago are now insufficient.

In February, 1947, the National Educational Association Executive Committee, aroused by the economic plight of the teacher, issued a statement which says in part:

The days of economic servitude and insecurity for teachers must be brought to a close. Teachers must have public respect, professional earning power, and economic security. They must be able to afford professional study, books, travel, and other means of enriching their minds and receiving physical strength to meet the heavy and exacting daily tasks of the classroom.

How much should a qualified teacher receive? The National Educational Association stands for a minimum annual salary of \$2400 for a qualified beginning teacher who is a college graduate.²⁴

It should be noted that this is a relatively modest demand since, after subtracting income taxes, this sum had, during the same month the statement was made, a prewar purchasing power of about \$1,315. Even this, however, would increase the

satisfactions of the teachers in service and help to meet the educational crisis caused by the immense teacher shortage.

Occupational Insecurity. Although encouraging progress has been made in the extension of tenure through legislation, the latest available data indicate that only nine states have state-wide laws which grant permanent tenure or "protective-type" continuing contracts, and this after probationary periods ranging up to five years. In sixteen states, certain districts grant permanent tenure. For the teaching group as a whole, these data mean that, as of 1917, 12.6 per cent of teachers are afforded definite tenure protection after a probationary period, a rise of about 10 per cent in coverage during the last ten years. Approximately one teacher in every seven has no legislative protection.²⁵

Even tenure laws do not afford ironclad protection. According to Prescott,

In many communities tenure laws are evaded by discharging all teachers about to enter tenure, employing new teachers in their places, and forcing the former ones to move elsewhere. In other communities teachers about to go on tenure are forced to resign, thus forfeiting their tenure rights. After several months of idleness, these teachers may be re-employed in the same system—but they remain without job security. Some communities hire new teachers only as substitutes, thus avoiding both tenure and salary regulations.²⁶

And after reviewing the wording of present day tenure laws and discussing instances in which loopholes were found in them, Beale concludes that "the best of tenure laws, then, protect against political interference and administrative vindictiveness if there are an aroused public opinion and a powerfully organized teaching group to support it, but alone it is a slim reed on which to lean."²⁷

In the previous discussion, there was an implicit assumption that permanent tenure was conducive to the better mental health of teachers. There are objections to tenure, however; the main ones are that it unduly decreases the powers of superintendents and that it makes it too difficult to dismiss incompe-

tent teachers. On the other hand, proponents of tenure list the following arguments, many of which have direct implications for mental health.

1. Tenure prevents the political control of schools and teaching positions.
2. It prevents the discharge of teachers for political, religious, personal, or other unjust reasons.
3. Tenure adds stability to the teaching staff, greatly reducing the rate of turnover in teaching positions.
4. It permits teachers to devote themselves to the practice of their profession without fear or favor.
5. It encourages competent and public-spirited teachers to remain in the profession.
6. It discourages school management based on fear and intimidation.
7. It enables teachers to support and defend the school administration before the public.
8. It protects teachers in their efforts to secure well-financed and adequate educational opportunities for children.
9. It stimulates professional growth and in-service training.
10. It helps to make possible a balanced, well-managed life.²⁸

There is a great need for carefully controlled scientific studies of the effect of tenure on the mental health of the teachers. The principles of mental hygiene appear to require it, but the necessity for tenure has yet to be conclusively proved. A recent study made in Indiana, which has had a tenure law since 1927, affords perhaps the best evidence yet produced. The investigator concludes, "This inquiry would seem to indicate that in Indiana the benefits . . . [of the tenure law] have outweighed the detriments. It would also seem to show that on the whole superintendents are not handicapped in their work by tenure. It would appear also that most teachers respond professionally to increased freedom and to protection from lay and school board interference and domination."²⁹

Restrictions on Outside Activities. According to a recent yearbook of the Department of Classroom Teachers,

One of the most vicious circumstances associated with teaching is the high wall of puritanic and unnatural restrictions on personal and academic freedom which so often hedge it about. By contractual agreement or the pressure of public sentiment the teacher often is denied the right to manage her own strictly personal affairs. In some cases she must avoid all friendships except with persons of her own sex. Sometimes she must buy her clothes from certain local stores. She is required to teach a Sunday School Class and contribute to every charity. She must associate with certain people in the community, but not with others. She must hold the "right" opinions on controversial questions and, without campaigning in any election, quietly vote the "right" ticket. She must not recommend books by certain authors, but indeed withdraw certain books from the public library. It is unsafe to entertain any idea not generally accepted in the community. Above all, she must not marry, for if she does, her job is gone. No convincing evidence has ever been offered to show that married women are less efficient after marriage than before. Neither has anyone explained why normal family ties are less important for teachers than for other individuals. Yet, the fact remains that most women teachers must choose between marriage and teaching. In the present Questionnaire Study, one third of the 3067 unmarried teachers who cooperated, expressed dissatisfaction, disappointment, and unhappiness because they were not married. Again and again, denial of the right to marry is mentioned by mental health specialists as one of the serious defects of the present teaching situation. . . . The result of this restriction, and of every other discriminatory and unnatural limitation imposed on teachers, is almost certain to be fear, subserviency, deceptiveness, and embitterment—attitudes diametrically opposed to mental health.³⁰

Evidence in support of many of these statements is found in a number of recent studies. Hanson and Umstatt in their study of 210 Minnesota communities discovered that 80 per cent barred married women from employment, two-thirds barred teachers who smoked, and a few communities (six) even rejected teachers who danced.³¹ Cooke and Simms present data to show that married women are employed as teachers in less than half of the cities in the United States of over 100,000 pop-

ulation and in less than one-fifth of the cities of between 30,000 and 100,000. Although nearly 70 per cent of the ninety-three largest cities employ married teachers, there is increasing discrimination against them in the smaller communities. In 1928, 32.6 per cent of women teachers were married, in 1931, 23.8 per cent, and in 1938 only 19.7 per cent.³²

Although the number of married women teachers increased markedly during the war period in many states, the implication of a recent study by Kramer is that their proportion would fall off again during the postwar period. "Of the twenty-one schools selected for the study only one employed married women before 1941, but in 1944 all but four employed them. . . . The opinions of the administrators did not change. In 1941 eight were favorable toward the employment of married women; thirteen were not. In 1944, the figure stood the same." ³³

The attitudes of 326 Ohio school board members toward a number of personal activities of teachers were ascertained by Cook and Almack. It was found that the board members would on the whole be willing to employ a teacher who drove her own car and who "dated a town person or another teacher." They were almost equally divided on the wisdom of permitting a teacher to leave the area over weekends, but the preponderant sentiment was against many of the practices of ordinary citizens. For example, the majority disapproved of a single teacher's (1) living in an apartment, (2) smoking in private and especially in public, (3) not attending church, and (4) dancing at a public dance. In every instance, it was felt that it was worse for the woman teacher to do such things than it was for a man.

These investigators also inquired into the nature of the response to community restrictions on the part of 2,870 teachers who were asked to fill out an appropriate questionnaire. They found that the majority (54.4 per cent) habitually accepted the restrictions of their communities, 13.9 per cent tried to educate the community toward greater tolerance, 12.1 per cent did not answer the question, and 9.9 per cent conformed unwillingly.

Only 3.3 per cent sought to evade or escape the conduct controls, and 1.3 per cent had protested about them.³⁴

That unnecessary restrictions, aside from the marriage barrier, are not confined to the two states mentioned is evidenced by Greenhoe's study based on a representative national sample of teachers. She states, "Findings indicate that community concern may readily go beyond the bounds of common sense and necessity. . . ." ³⁵

The Lack of Acceptance by the Public. The adults in the community do not readily accept the teacher as one of them. Some welcome the opportunity of "talking back" to the teacher, while others assume a patronizing air. Still others are somewhat in awe of the teacher and tend to keep all relationships with him on a formal basis. Invitations to the homes of parents in the community are seldom extended on the basis of interest in the teacher as an individual but because he is "Junior's teacher."

Similarly Greenhoe believes that the teacher's psychological status in the community is very similar to that of the stranger.

The stranger is said to be in the community but not of it; he is a part of its mode of life, and yet he is distinct from its way of living. It is this detachment which gives to him the objectivity for which he is justly noted. . . . Teachers are indeed strangers in the community where they teach. The novice discovers this fact in many ways, and the experienced teacher grows increasingly aware of the barrier between himself or herself and the mine-run of school patrons and dwellers in the town. The teacher is a teacher, somehow different, and better than ordinary persons, yet the exact nature of the teacher's prestige has never been made known through scientific study and may be readily overestimated.³⁶

Autocratic Administration and Supervision. It is difficult to estimate the proportion of schools in which autocratic administration is practiced, although it would appear that it is the rule rather than the exception. Anderson states, "An authoritarian concept of school management and teaching is widely accepted and practiced in institutions that prepare teachers and in ele-

mentary and secondary schools." ⁸⁷ Although Prescott does not indicate the extent of autocratic procedures, he believes:

There are still too many administrators who are at least semi-dictators and too many supervisors who feel offended if a teacher develops procedures of her own instead of following closely the supervisor's techniques. Teachers are still frightened by some principals and still try to give the "right" answer in teachers' meetings instead of freely entering a discussion. Many teachers are still afraid to ask help on their more difficult problems because they are afraid to admit they have such problems—it might affect their ratings.⁸⁸

The results of such administration and supervision are a lack of creativeness, a frustration of the need for independence, and a diminution of self-esteem. It creates especial difficulties in adjustment for the young teacher who, anxious to put into practice the newer educational methods, finds that variations are not permitted.

Other Dissatisfactions. The professional load of teachers is sufficiently great, as has been indicated, to create a strong need for recreation. Yet many communities are without facilities. The results of Peck's study in which 24 per cent of the teachers felt the absence of recreational facilities to be a source of maladjustment in their own lives ⁸⁹ is in agreement with Prescott's listing of inadequate time and facilities for recreation as a major unmet need of teachers.⁴⁰ The lack of desirable living arrangements, congenial associates, and adequate equipment for teaching are all felt by a sizable proportion of teachers.

Concluding Remarks. Lest it be forgotten that the sources of dissatisfaction just discussed do not affect all public school teachers and that the average teacher cannot be considered a downtrodden drudge who cannot call his soul his own, let us recapitulate some of the more favorable aspects of the conditions just described. Teachers do have week ends free of classroom work and long vacations for recuperation. The salaries of many teachers, particularly those in the larger cities, allow for a reasonably pleasant existence. All states have state-wide

retirement or pension plans. Nearly a half of the teachers are reasonably secure by law in their jobs as long as they maintain their competence, and many more have actual though not legal tenure. Occupational security is probably just as great if not greater than in nonteaching vocations.

The vast majority of women teachers in the larger cities at the present time are permitted to marry, and there is still some hope that the wartime trend toward hiring married women teachers in the smaller communities will be maintained. Again, a good share of teachers, particularly in larger communities, do not suffer from undue restriction on their personal lives or on their rights as citizens. Many teachers are highly respected in their communities and are considered on a par with doctors, lawyers, ministers, and other professional people. It is the minority of teachers, not the majority, who suffer from lack of desirable living arrangements, congenial associates, and adequate equipment.

There are strong forces working toward democratization of administration. Even at the present time, according to Prescott, many school administrations are truly democratic.

In many cases this relationship [that maintained by supervisors and administrators to the teaching personnel] is an admirable one. Teachers participate in the development of curricula, they have freedom to vary procedures in accordance with the needs and interests of pupils and to take advantage of significant happenings in the community or the world. . . . Teachers working under such conditions are not mere artisans applying automatically the rule of thumb techniques which they have learned—they can be real artists shaping the personalities of their pupils through every classroom happening. They have a sense of personal worth, of the significance of the roles which they are playing in the lives of their pupils. Under these conditions, teaching becomes a profession and a satisfactory occupation for fulfilling the . . . [personality] needs of the teacher.⁴¹

**WAYS OF IMPROVING
THE MENTAL HEALTH OF THE TEACHER**

Improvement of the Conditions of Teaching. Some of the conditions conducive to maladjustment in teachers stem from the cost of education. Inadequate salaries, insufficient clerical help resulting in a multiplicity of routine details, lack of recreational facilities, inadequate equipment in the schools, and lack of universality in retirement and pension systems—all have their roots in consideration of expense. The individual teacher is not the effective unit for securing community understanding of the need for larger appropriations to improve these conditions. Nor can he expect singlehanded to democratize autocratic administration, institute tenure legislation, or change those cultural attitudes which result in unjust restrictions upon his personal life. Prescott suggests:

The best defense that teachers can have against their present vulnerability probably lies in the direction of the permeation of the teaching staff by a more genuinely professional feeling, implemented by strong professional organizations. Physicians treating the most baffling cases do not feel this weakness nor show signs of the resultant "inferiority feeling." They have a strong association to defend them. Apparently, teachers need to strengthen greatly their professional associations, to develop in these associations techniques and facilities for educating the public regarding the obligations and rights of members of the profession.⁴²

Flsbree, in speaking of groups whose aim is to reduce teachers' salary scales, states:

For teachers to sit idly by like Pontius Pilate and wash their hands of the whole matter would be to sacrifice professional standards which have taken decades to achieve and which over a period of years are closely related to the welfare of children. . . . To protect the interests of the service to which they have consecrated their lives is not a selfish objective . . . teachers . . . through their associations should protect their members against unjust salary practices and should employ pressure methods when necessary to defend a just cause.⁴³

Although local and state associations can be very effective in improving conditions in their localities, a national group or groups are needed to demand and get Congressional legislation which will effectively tend to equalize the tremendous disparity among the states in their ability to pay for an adequate educational system. Until this is accomplished, many states will be unable to increase to any great extent their educational expenditures.

Improving the Mental Health of Prospective Teachers. Although the methods to be described in the subsequent section will be for the most part applicable to the prospective as well as to the practicing teacher, certain methods are more suitably employed before entrance into the profession. Nearly all authorities are agreed that improvement could be made by teacher training institutions in the selection of students with better physical and mental health. Effective and practical means for accomplishing this result are, however, difficult to find. Adjustment schedules, of course, are not serviceable for this purpose and, indeed, have actually failed in institutions which have attempted to use them.⁴⁴ The personal interview may be effective when employed by a sensitive and competent individual but even then there is a reluctance to bar individuals on such subjective grounds. The Rorschach test, described in Chapter XXI might be an effective instrument, but its use would entail considerable expense, and one attempt to distinguish very good from very poor teachers on the basis of the test alone did not succeed very well.

In the preservice training, more and better courses should be offered in mental hygiene. Students typically like such courses and many gain a great deal of insight through them. If, in addition, enough psychological counselors or psychotherapists and medical services could be provided in all teacher training institutions, great strides could be made in increasing the mental health of the profession.

How the Teacher Can Improve his Own Mental Health. Can reading about methods of improving one's mental health help an individual in doing so? To quote Leeper:

The best answer can be gotten if we consider the analogous question: Can books teach a person how to swim? Probably no one has ever learned to swim merely by studying books on how to do it. No matter how complete a book on swimming may be, getting into the water calls for additional learning. . . . To learn how to swim, one needs a combination of theoretical analysis of how it should be done and of actual practice. There is the answer then. . . . Books can help one to see possible ways of doing things, and books can call attention to one's faults of technique.⁴⁵

Of course, to some extent what help a person gets depends upon the soundness and practicality of the books he reads. Many books will tell one to (1) develop the habit of success, (2) face reality, (3) react normally to emotional situations, and (4) avoid worry. These are unquestionably most desirable goals, but unfortunately most books either indicate their means of achievement so vaguely that it is too hard to find the way, or suggest, in effect, that one should grasp himself firmly by the bootstraps and lift. Some suggest a series of tricks such as auto-suggestion—"Every day in every way I am getting better and better"; other books seek to inspire an individual with a fine flush of renewed vigor and hope—"The seeds of success are within you, you have but to move ahead." In the final analysis, tricks and inspiration are not likely to do very much good because they seldom have any permanent effect. Occasionally a person may find a somewhat helpful suggestion, and in any case they are likely to be harmless.

Let us recognize at the start that improving one's mental health unaided and without a concurrent change in the environment is not easy; some improvement can often be made, but the basic structure of the personality is not likely to be altered. Psychoanalysts sometimes spend years of daily sessions in an attempt to alter certain personality trends in a person and still do not always succeed. Even minor changes are often difficult to effect; sometimes a little annoying quirk has a root buried deep in the yesterdays and, like quack grass, is immune to surface treatment. On the other hand, the root may be almost ready to fall out of its own accord, and a slight twist of

the wrist will bring it forth; another will consign it to oblivion. It is often difficult to tell what the result will be until the attempt is made.

Developing insight. There are many half-truths which pretend to be principles of mental hygiene. One is that "it is morbid to introspect"; that to try to analyze one's own motivation and behavior results in depression. It is true that many people in reading a list of symptoms of neurosis find most of them in themselves and are likely to feel somewhat "blue" about their prospects of "achieving normality." But that is because neurotic feelings are exaggerations of the normal and few persons have sufficient comprehension of "normal" feelings to be able to appraise correctly their own subjective states. To be sure, the true neurotic suffers more than the normal, even though the latter thinks he has just as many symptoms. Even though occasional "blue" periods may occur, self-analysis is not permanently depressing. If it is not in itself the product of some deeper lying source of difficulty, it is very likely to have constructive results.

There are a number of ways of increasing self-insight, some of which have been suggested in previous chapters. Often it is helpful to try to discover which indirect methods of tension reduction one uses and then to consider whether one is getting full value from them. It is possible, after such consideration, to decrease or increase the extent to which one uses those of which one has become aware or even to change the character of the method. For example, it may be possible to change from a socially disapproved to a socially approved form of compensation. It is often helpful to analyze one's fantasies or daydreams. By the expenditure of a slight effort in noting the content of repeated fantasies, one may be able to articulate important but unrecognized needs. After the needs are out in the open this way, it may be possible to devise means of achieving in reality the goals previously fantasied.

Many people find it helpful to pay particular attention to the circumstances under which they react with strong emotion. At first glance the emotion may seem to be a natural and in-

evitable resultant of the situation, but analysis of such episodes will often reveal emotionally charged feelings concerning aspects of one's personality of which he is unaware. In the same way, strong negative feelings toward another person should be examined. In this case, discovering whether one's feelings are shared by others is usually of crucial importance. If it is found that the feeling is not shared by others, it is worth-while to seek to discover the reason. Sometimes a careful search will reveal a resemblance to someone who has been a source of mistreatment in the past. When such a discovery is made, the feeling may disappear. Even if it does not, however, one can with a clear conscience avoid unnecessary future contacts with the person.

An objective analysis of the frustrations and satisfactions in one's vocational and private life is frequently helpful. An effort to decide which frustrations must be borne and which one can work to eliminate often pays good dividends. Due respect must be paid to the half-truth that "what happens to you is far less important than your attitude toward the event." This dictum, as usually interpreted, means that the nature of events in one's life can be sharply separated from one's attitudes and feelings about them. Of course that is not true. Failure cannot give the same glow of pleasure that success does "if one only has the right attitude." On the other hand, failures are often not such great disasters as they seem at the time.

Accepting oneself. If an individual accepts himself it means that he is not continually engaged in self-improvement; that he is not continually castigating himself with his failures and weaknesses; that he is willing to allow himself some latitude in behavior and feelings.

The first step in accepting oneself is a continuation of self-analysis. When a teacher tries to formulate his goals and examine them in relation to his abilities, he will in all probability find that the goals are much higher than he can possibly reach. Teachers are likely to suffer from inordinately high goals because (1) they are likely to base them on a composite of the best qualities of others, (2) their childhood has often

been one of striving to meet their parents' overhigh expectations, which they have, in part at least, accepted, and (3) they are in a profession in which evaluation of success is extremely difficult, and, because of their training in childhood, are more likely to underestimate than overestimate the quality of their work.

After defining the nature and height of one's goals, an attempt should be made to lower those which are too high and to decide on those aspects of one's personality and abilities which are to be left alone. This is a very difficult thing to do, but the examination process may furnish the first fairly true grasp of what one was attempting (without success) to do. It often helps to use as a criterion, "*What can I conveniently achieve?*"

As has been indicated in previous chapters, most people are not continuously kind, thoughtful, generous, self-abnegating, and pure in heart. Everyone feels mean, envious, hurt, angry, rebellious, self-centered, and lustful at times. When a person really tries, it is not so hard for him to admit it to himself. If an individual has done something unusually "shameful," it often helps to try to discover the source of the impulse; and, whether or not he can find it, telling a trusted friend about it often helps. If too many of one's actions and feelings appear unbelievably bad, it is wise to consult an expert. One can be sure that he is familiar with even guiltier people.

A great aid toward feeling comfortable with oneself is to substitute for individualistic aims the welfare of humanity. It may be enough to identify oneself so completely with the welfare of one's pupils as to achieve the submergence of the self. Usually, however, it is helpful to have, in addition some adult group or organization, whether it be religious, charitable, or whatever, to whose aims one can be devoted and for which one can wholeheartedly work. In this way, without directly seeking them, the precious feeling of "belonging" and the sense of significance in one's life can be achieved.

Actions to take. (1) Get a physical examination. See your doctor and your dentist, and get whatever repairs your body requires. (2) Find out the recreational facilities in your com-

munity. You may have overlooked some. Recreation will afford an opportunity not only for relaxation but for congeniality as well. (3) Join an organization of teachers. Select at least one local and one national organization whose aims, program, democratic functioning and methods appeal to you as offering a constructive attack on the improvement of teaching conditions. Be an active member. (4) Keep your friends, use them, and be useful to them. If you have only one or two friends, a few more won't hurt, but quality is more important than quantity. Complete self-sufficiency is an unhygienic goal. Make one of your friends a confidant, but it is unnecessary to bare your whole soul to him. Use discretion. (5) Express your hostile feelings. Let off a little steam directly once in a while. Seek and try out means which constitute socially useful or harmless forms of indirect expression. (6) Make a plan for yourself. Decide what changes you will make in your life and how you are going to accomplish them. Don't be too ambitious. Start in easily. (7) Don't be afraid to consult an expert about your troubles. He will probably be the most understanding and helpful person you have ever known.⁴⁶

A few tricks. As was previously mentioned, a trick is occasionally useful, depending on how good it is and on whether it fits the particular case. Here are a few tricks which some people have found useful. When you have just suffered a blow to your self-esteem, try deliberately to do something you know you will enjoy, preferably something that has previously bolstered your self-esteem. If you have a difficult and fearsome experience ahead of you, for example, your first speech before a large group, don't keep telling yourself that you will *not* have stage fright. Concentrate on the worth-whileness of the things you have to say. When the frustrations of life seem greatly to outweigh the satisfactions, tell yourself (what really is true), "Even this shall pass away." Many women profit a great deal through "a good cry." Don't be afraid to let yourself go in this way occasionally, but, of course, it is inadvisable in public. Forcing yourself to face a distasteful situation is fre-

quently unnecessary. Occasionally it has to be done. It generally turns out to be not half as bad as was expected.

SUMMARY

The mental health of an individual is dependent to some extent upon the satisfactions and dissatisfactions inherent in the culture and social order.

Among the variety of satisfactions inherent in the American culture are: (1) lack of rigidity in customs, (2) vast numbers of socially useful occupations, (3) unexcelled educational opportunities, (4) relative fluidity of class lines, and (5) most important of all, the strong democratic tradition.

Among the major contradictions embedded in the American culture are: (1) competition and success versus brotherly love and humility, (2) stimulation of needs versus frustrations in satisfying them, (3) alleged freedom versus factual limitations, (4) puritanic attitude toward sex versus strength of the sex urge, (5) doctrine of social equality versus practice of discrimination.

The nature of adjustment problems depends to some extent on the phase of life. After the childhood years the second phase of life is characterized by great vitality, exploratory activities, and a forward-looking attitude; the third phase is characterized by "settling down," a strong interest in family and social life, and the greatest contribution in vocational life. The fourth phase includes the beginning of regressive growth, overly critical "stock-taking" by men and the climacteric in women, the fifth phase usually requires a restriction of activities because of increasing physical weakness. The most troublesome adjustment problems of the unmarried man and woman stem from the difficulties in (1) maintaining satisfactory social relationships and (2) meeting the sexual and affectional needs.

Important sources of satisfaction in teaching arise from (1) the socially useful character of the work, (2) the creative expression involved, (3) the stimulation of broad interests, (4) personal growth, (5) the opportunity for association with youth,

(6) the opportunity to influence public policy, (7) the merging of one's interests with those of the group, (8) the partial satisfaction of the needs for affection, independence, and for maintaining the self-esteem.

Important sources of dissatisfaction in teaching arise from (1) the heavy pressure of required work, (2) inadequate salaries, (3) occupational insecurity, (4) restrictions on outside activities, (5) the lack of acceptance by the public, (6) autocratic administration and supervision. To improve the mental health of the teacher it is necessary to improve the conditions of teaching. This can best be effected by means of strong professional organizations. It is also necessary to improve the selection of students for teachers' colleges and provide psychological counseling and medical services for them during their years of training. The teacher can improve his own mental health if he is able to increase his understanding of himself, accept himself largely as he is, and take an active part in directing his life rather than being content with responding to pressures.

QUESTIONS AND EXERCISES

1. It has been suggested that "*mens sana in societate sana*" be substituted for the motto "*mens sana in corpore sano*." Do you think such a new emphasis necessary or advisable? Explain.
2. Are the contradictory cultural values mentioned characteristic of all societies? Why not? Are any of them changing at the present time?
3. List as many ways as you can in which teaching affords an opportunity for growth.
4. Take the list of personality needs in Ch. XVIII and try to estimate the extent to which they are fulfilled in the life of the average teacher. Do the same for the organic needs.
5. What arguments may be advanced which are favorable to and opposed to the employment of married women teachers?
6. School board members were found to favor certain restrictions on the personal lives of teachers. Can you find any data which indicate that school board members are more liberal, about the

same, or more conservative concerning such matters than the community as a whole?

7. What can teachers do to bring educational expenditures up to a point more in line with the educational needs of a democracy?
8. Outline an ideal plan for the democratization of administration in the elementary and secondary schools. What groups should have a voice in a democratically organized school? What functions should each group have?
9. What is the basis for the common belief that self-analysis is unwise? What are some of the limitations of self-analysis?
10. Why is it so difficult for individuals to accept themselves as they are? How can self-acceptance be distinguished from smugness?

INDEX OF AUTHORS

- Abel, T. M., 209
 Abernathy, E. M., 54, 81, 84
 Achilles, P. S., 796
 Adler, A., 614
 Aldrich, C. A., 82
 Aldrich, M. M., 82
 Alexander, F., 731
 Allport, G. W., 304, 311, 313, 612, 634,
 644, 646, 695, 696, 725, 731, 764
 Almack, R. B., 798
 Alschuler, R. H., 211, 597, 612
 Alster, B., 610
 Anderson, G. L., 520
 Anderson, H. H., 165
 Anderson, J. E., 82, 168, 211, 245, 312,
 608
 Anderson, W. A., 783, 798
 Andrew, D. M., 264
 Appel, F. S., 314
 Arps, G. F., 282
 Averill, L. A., 777, 797

 Bach, G. R., 211
 Badanes, J. E., 520
 Badanes, S., 520
 Bagley, W. C., 774, 776, 797
 Bailey, E. W., 762
 Baker, E., 612
 Baker, H. S., 764
 Baker, H. V., 185, 209
 Baldwin, B. T., 50, 53, 81
 Barker, R., 611
 Barlow, M. C., 520
 Barr, A. S., 569
 Bartlett, F. C., 410
 Barton, J. W., 366
 Barton, W. A., 409
 Baruch, D., 762, 796
 Baruch, D. W., 643, 645, 799
 Bassett, C., 729, 731
 Bassett, S. J., 410
 Bavelas, A., 731
 Baxter, B., 717, 731
 Bayles, E. E., 521
 Baylev, N., 81, 83
 Beale, H. K., 779, 797, 798
 Beard, C. A., 444
 Beard, M. R., 444
 Becker, H., 765, 796
 Bell, H. M., 609
 Bell, J., 122
 Belles, B., 83
 Bender, L., 121
 Benezet, L. P., 47
 Bentley, J. E., 280
 Benneuer, R. G., 610, 739
 Bettelheim, B., 646, 696
 Bever, E., 611
 Brienstock, S. F., 46, 47
 Bills, A. G., 354
 Binet, A., 213, 220, 226
 Bingham, W. V., 280
 Bird, C., 312, 407, 483
 Bird, D. M., 407
 Bishop, E. L., 762
 Blatz, W. E., 170
 Blonsky, P. P., 207
 Boas, F., 51
 Bode, B. H., 326, 338, 339
 Bodenhalter, W. B., 730
 Bogardus, E. S., 571
 Bolles, M. M., 691, 708, 709, 730
 Bond, E. A., 253, 282
 Bond, G. L., 260, 282, 313, 409
 Boreas, Th., 393
 Bowers, A. M., 695
 Boyd, E., 81
 Boynton, P. L., 280, 717, 730
 Breed, F. S., 505, 520
 Brian, C. R., 81
 Bridges, K. M. B., 121
 Buggs, T. H., 491, 519
 Brodbeck, A. J., 209
 Bronner, A. F., 695
 Brooks, F. D., 82, 410
 Broom, M. E., 569

- Brown, C. M., 444
 Brown, E. W., 611
 Brown, J. F., 635, 636, 646, 694
 Brown, L. S., 122
 Brownell, W. A., 206, 313, 325, 339, 521
 Brueckner, L. J., 281, 569
 Brumbaugh, F., 123
 Bryan, W. L., 360
 Bühler, C., 120, 165, 167, 768
 Bugess, E. W., 731
 Burgum, M., 729
 Burke, A., 282
 Burks, B. S., 230, 245, 730
 Burnham, W. H., 119
 Buros, O. K., 569, 608, 609
 Burt, C., 209, 244, 249, 253, 259, 260, 281, 282
 Buswell, G. T., 338

 Caille, R. K., 171
 Caldwell, O. W., 171
 Calkins, L. A., 46
 Campbell, N. M., 718, 719, 720, 731
 Cannon, W. B., 119, 615
 Cardwell, J. F., 798
 Carmichael, L., 44, 45, 81, 121, 207, 208, 608
 Carroll, H. A., 14, 241, 512, 521
 Cason, E. B., 539, 571
 Cattell, M. Mc., 7
 Challman, R. C., 122, 168, 170
 Charles, M. W., 170
 Charters, W. W., 797
 Chazal, C. B., 313
 Child, I. L., 695
 Chittenden, G. E., 611
 Clark, F. L., 281
 Clark, M., 108
 Clark, W. W., 610
 Clarke, W. V., 738
 Clugston, H. A., 409
 Coerth, W., 14
 Coghill, G. E., 45
 Cohen, M. R., 482
 Commens, W. D., 13, 364
 Conel, J. L., 15
 Conklin, E. S., 13
 Conrad, H. S., 120, 207, 228, 244, 245, 641
 Cook, L. A., 730, 798
 Cook, W. W., 312, 571
 Cooke, D. H., 781, 798
 Cox, J. W., 520
 Cox, W. W., 264, 282
 Crampton, C. W., 55, 81
 Criswell, J. H., 609
 Crossley, E., 539, 571
 Cruickshank, R. M., 44
 Cruze, W. W., 13
 Cull, N. B., 14, 571
 Cunningham, R., 583, 584
 Cutts, N. E., 720, 728, 731, 764

 Dark, H. J., 798
 Dashnell, J. F., 338, 339
 Davies, D. R., 365
 Davis, A., 165, 167, 168
 Davis, E. A., 179, 208
 Davis, K. B., 796
 Davis, R. A., 409, 410
 Dawe, H. C., 170, 171
 Del Solar, C., 122
 Dennis, C. H., 798
 Dennis, W., 122, 165, 168, 183, 209
 Deshaies, L., 209
 Deutsche, J. M., 207, 209
 Dewey, J., 300, 313, 321, 339, 408, 422, 441, 452, 453, 482, 483, 511, 521
 Dewey, J. C., 441
 Dolger, L., 169, 612
 Doll, E. A., 610
 Dollard, J., 119, 166, 169, 637, 644, 646, 688, 696
 Doob, L., 614, 616, 696
 Dorsey, M. F., 521
 Douglas, O. B., 14
 Drake, R., 445
 Driscoll, G. P., 608, 762
 Dudycha, G. J., 45, 208
 Dudycha, M. M., 45, 208
 Dugger, H., 717, 730
 Dunham, H. W., 730
 Dunlap, J. W., 612
 DuShane, D., 798
 Dwyer, F. M., 82

 Ebbinghaus, H., 393
 Edwards, A. L., 484
 Eisenberg, P., 733, 763
 Ernsen, J., 281
 Filthott, G. L., 768, 795, 796
 Elliott, H. S., 795
 Ellis, A. L., 365, 610, 611, 612
 Elsbree, W. S., 786, 798
 English, H. B., 13, 122, 397, 410
 Erickson, M. H., 633, 646, 696
 Erikson, E. H., 611

- Eskridge, T. J., 313, 439, 445
 Espenschade, A., 66, 83, 84
 Eurich, A. C., 14, 608
- Faegre, M. L., 82
 Faris, R. E. L., 730
 Fawcett, H. P., 521
 Fay, P. J., 82
 Featherstone, W. B., 764
 Fehlman, C., 47
 Fendrick, P., 260, 282
 Fenchel, O., 766, 796
 Ferson, M. L., 261
 Figge, M., 729
 Fisher, V. E., 673, 694, 696
 Fite, M. D., 167, 168, 170, 171, 172, 688, 696
 Fitz-Simons, M. J., 729
 Fleming, C. W., 216
 Flory, C. D., 83
 Forlano, G., 377, 409, 610
 Foster, J. C., 82, 211
 Frank, J. D., 409
 Frank, L. K., 81, 167, 211, 611
 Frankel, E., 768, 796
 Freeman, F. N., 13, 82, 207, 231, 244, 245, 361, 569, 610, 614
 Freeman, F. S., 13
 Freud, A., 696
 Freud, S., 122, 656
 Frogner, E., 339
 Frosch, J., 121
 Fiver, D., 570, 612
 Furlcy, P. H., 166, 168, 170
- Gardner, B. B., 169
 Gardner, M. R., 169
 Garrison, C. G., 282
 Gates, A. I., 1, 46, 17, 84, 207, 281, 283, 313, 315, 407, 409, 501, 520, 570, 571, 761
 Gates, G. S., 86, 120, 121
 Gerbench, J. R., 570, 612
 Germane, E., 409
 Gesell, A., 41, 46, 82, 83, 86, 120, 169
 Giesecke, M., 84
 Gilliland, A. R., 281
 Gimandes, J., 169, 612
 Glaser, E. M., 481
 Goddard, H. H., 612
 Goldfarb, W., 122
 Goldman, B., 170, 172, 609, 610
 Good, C. V., 569
- Goodenough, F. L., 82, 84, 86, 92, 119, 120, 121, 215, 245
 Gray, W. S., 313, 445
 Green, E. H., 149, 171
 Green, G. H., 207, 210
 Greenberg, P. J., 171
 Greene, H. A., 570
 Greenhoe, F., 783, 798
 Gregory, W. S., 481
 Greulich, W. W., 54, 81
 Griffith, C. R., 14, 364
 Griffiths, B., 721, 731
 Griffiths, R., 207, 210
 Grosslight, J. H., 695
 Grossnickle, F. E., 520
 Guilford, J. P., 367, 368, 408
 Guttendage, M. V., 84
- Haggetty, M. S., 610
 Hagman, I. P., 168, 170
 Hagman, R. R., 121
 Halverson, H. M., 83
 Hamalainen, A. F., 609
 Hanson, E. M., 781, 798
 Harper, E. B., 730
 Harrower, M. R., 169, 211, 612
 Hart, B., 678, 696
 Hart, F. W., 716, 721, 730
 Harter, N., 360
 Hartmann, G. W., 11, 339
 Harvey, O. L., 796
 Hathaway, S. R., 761
 Hattwick, B. W., 172, 730
 Hattwick, I. A., 211, 597
 Havighurst, R. J., 166, 169
 Hawkes, H. F., 570
 Hayakawa, S. I., 420, 443, 444
 Hazlett, V., 209
 Healy, W., 695
 Heath, F., 762
 Hendricks, I., 13, 415
 Heiliger, I., 47
 Helmholtz, H., 451
 Henry, T. R., 637, 646
 Heitz, M. R., 611
 Hertzberg, O. I., 346, 365
 Hildebrand, G., 216, 246, 365, 610, 612
 Hilgard, E. R., 337
 Hilgard, J. R., 26, 46, 291, 313
 Hull, A. S., 761
 Hill, D. S., 612
 Hoban, C. I., Jr., 411
 Holland, B. F., 14

- Hollingworth, H. L.**, 36, 47, 119, 695
Hollingworth, L. S., 166, 171, 234, 244, 251, 282
Holmes, E., 409, 445
Holmes, F. B., 112, 120, 121, 122, 123, 730
Holzinger, K. J., 231, 245
Hopkins, L. T., 521
Horn, E., 313, 417, 444, 445, 456, 483, 504, 520
Horney, K., 121, 166, 766, 795, 796
House, S. D., 610
Hubbard, F. W., 608, 611
Hugo, V., 488
Hull, C. L., 281, 433, 435, 445
Hunt, J. McV., 121, 207, 210, 611, 694, 695
Hunt, T., 264
Hurlock, E. B., 207
Hutchinson, E. D., 484

Ilg, F. L., 82, 83
Irwin, O. C., 45, 209
Isaacs, S., 120, 121, 166

Jack, L. M., 172
Jackson, C. M., 21
James, W., 17, 45, 488
Janney, J. E., 14
Jenkins, L. M., 65, 83
Jennings, H., 171
Jensen, F., 764
Jensen, K., 45, 207
Jensen, M. B., 408
Jersild, A. T., 46, 47, 82, 120, 121, 122, 123, 166, 167, 168, 170, 171, 172, 197, 207, 210, 211, 313, 608, 610, 613, 730, 762
Jersild, C. L., 122, 170, 172
John, E., 121
Johnson, D. M., 482, 483
Johnson, M. W., 172
Johnson, P. O., 410
Jones, H. E., 81, 82, 120, 121, 207, 228, 245, 644
Jones, M. C., 121, 613
Jones, T. D., 83, 84
Jordan, A. M., 14
Jorgensen, A. N., 570
Judd, C. H., 6, 14, 407, 483, 498, 499, 500, 520
Justin, F., 123

Kandel, I. L., 569
Kao, Dji-Lih, 366
Katona, G., 369, 408, 410
Katz, B., 696
Kawin, E., 610
Kefauver, G. N., 570
Keister, M. E., 156, 172
Keith, J. A. H., 774, 776, 797
Kelley, T. L., 207, 210
Kelly, W. A., 14
Kerstetter, L. M., 609
Killian, C. D., 397, 410
Kimmons, C. W., 121
King, L. M., 274, 283
Kingsley, H. L., 312, 337, 407, 482
Kinsey, A. C., 56, 83, 796
Kirkendall, L. A., 657, 695
Klein, D. B., 644
Kline, L. W., 490, 519
Knight, R. P., 656, 695
Knowlton, D. C., 445
Koch, H. L., 168
Köhler, W., 316, 338
Koob, H. F., 484
Kopel, D., 365
Kotinsky, R., 312, 728, 762
Kounin, J., 611
Kraft, R. M., 82
Kramer, J. H., 782, 798
Krey, A. C., 207, 210
Kubie, L. S., 646
Kuder, G. F., 613

LaBrant, L., 443
Lamaire, A., 408
Landis, A. T., 83
Landis, C., 83, 120, 694
Langer, W. C., 625, 643, 644, 645
Lantz, B., 409
LaRue, D. W., 14
LaSalle, D., 82
Laton, A. D., 762
Leahy, A. M., 231, 245
Learned, J., 47, 246
Lederer, R. K., 81
Leeper, R., 314, 787, 795, 799
Lehman, H. C., 73, 84
Lerner, E., 611
Leuba, C., 171
Lev, J., 610
Levy, D., 705, 706, 729, 730
Levy, J., 120, 689, 696, 703, 729

- Lewin, K., 121, 409, 621, 643, 644, 645, 646, 686, 694, 696, 698, 717, 729, 731
- Lewis, D., 282
- Limburg, C. C., 730
- Lindbergh, A., 303
- Lindbergh, C., 303
- Lindquist, E. F., 520, 570, 571
- Lippitt, R., 156, 166, 168, 172, 313, 696, 717, 731
- Lislett, L. R., 410
- Loeb, M. B., 169
- Loftus, J. J., 170, 172, 609, 610
- Loman, W., 264
- Lorge, I., 234, 246
- Louttit, C. M., 728, 731, 762
- Lowenstein, P., 172
- Lunt, P. S., 167, 169
- Maier, N. R. F., 483
- Maller, J. B., 171, 610, 737
- Mann, C. R., 570
- Manwell, E. M., 172
- Markey, F. V., 122, 167, 171, 210
- Marquis, D. P., 45
- Marsh, C. J., 763
- Martens, F. H., 763
- Martin, C. E., 83, 796
- Maslow, A. H., 645, 646, 694, 730
- Masserman, J. H., 639, 646, 689, 696
- McAndrew, W., 776, 797
- McCall, W. A., 569
- McCarthy, D., 179, 207, 208
- McConnell, T. R., 10, 337, 338, 339, 502, 520
- McCune, G. H., 483, 484
- McFarlane, J., 211
- McFarlane, M., 84
- McFarland, M. B., 170
- McGeoch, G. O., 408
- McGeoch, J. A., 301, 312, 313, 337
- McGraw, M. B., 24, 44, 45, 46, 47, 291, 292, 313
- McHugh, G., 233, 246
- McIntosh, J. R., 407
- McKim, M., 282
- McKinley, J. C., 764
- McKinnon, K., 169, 170, 171
- McLellan, F. C., 46
- McLeod, B., 763
- McTryon, C., 609
- Mead, M., 731
- Meehl, P. E., 763
- Meek, L. H., 82, 120, 166, 168, 366, 409
- Meier, N. C., 82
- Meigs, M. F., 121, 122, 608, 613
- Melton, A. W., 337, 339
- Meltzer, H., 208
- Mengert, I. G., 170, 172
- Menninger, K. A., 675, 694, 696
- Merrill, M. A., 214, 244, 247, 248, 281
- Metcalf, L., 613
- Metzger, H. F., 708, 709, 730
- Middleton, 261
- Miller, N., 644, 646, 696
- Millichamp, D. A., 170
- Mitchell, B. C., 245
- Mittelman, B., 616, 694, 730
- Mooney, R. L., 610
- Moore, F. V., 209
- Moreno, J. L., 166, 170, 609, 724, 731
- Morgan, J. J. B., 668, 695, 763
- Morse, H. T., 483, 484
- Mosley, N., 720, 728, 731, 764
- Moss, F. A., 264
- Mowler, O., 644, 646, 696
- Muenzinger, K. F., 339, 410
- Munn, N. L., 483
- Munroe, R., 120, 696, 703, 729
- Murchison, C., 165, 168
- Murphy, G., 13, 166, 210, 764
- Murphy, L. B., 120, 166, 170, 312, 611
- Murray, H. A., 612, 613, 644, 645
- Musell, J. L., 11, 244, 519
- Myers, G. C., 208
- Nagel, E., 482
- Nelson, A. K., 45
- Nelson, E., 210
- Nestrick, W. V., 84
- Newburn, H. K., 441, 445
- Newcomb, T. M., 166
- Newell, H. W., 729
- Noble, F. L., 282
- Nolte, K. F., 415
- Nora, F. F., 484
- Norem, C. M., 518
- Northway, M. L., 408
- Oakden, E. C., 210
- Oakes, M. E., 209
- Oden, M., 171
- Ogden, C. K., 426, 445
- Olson, W. C., 609, 610
- Omwake, L., 123

- Orata, P. T., 511, 519, 521
 Orleans, J. B., 282
 Orleans, J. S., 264, 282, 569
 Osborne, E. G., 84, 122, 167, 613
 Osburn, W. W., 472, 484
 Otto, H. J., 281, 570

 Pace, C. R., 445, 608
 Panlasigui, I., 409
 Patey, H. C., 728
 Patrick, C., 484
 Pearson, K., 228, 245
 Pechstein, L. A., 371, 408
 Peck, L. A., 777, 784, 797, 798
 Peck, M. W., 796
 Pedersen, R. A., 763
 Peters, C. C., 539, 571
 Peterson, H. A., 409
 Piaget, J., 209
 Pilafian, G. J., 82
 Pintner, R., 216, 281, 586, 609, 610
 Pistor, F., 47, 187, 210
 Pitts, M. W., 708, 709, 730
 Plant, J. S., 645, 697, 698, 724, 729, 731, 795
 Pomeroy, W. B., 83, 796
 Poynitz, I., 83
 Pratt, K. C., 44, 45
 Prescott, D. A., 120, 167, 643, 728, 730, 731, 779, 784, 785, 786, 797, 798
 Pressey, L. C., 186, 210
 Pressey, S. L., 14
 Preston, R., 210
 Proctor, W. M., 250, 281

 Queen, S. A., 730

 Ragsdale, C. E., 365
 Ramsay, G. V., 83
 Rath, L. E., 609, 613
 Rebello, S., 210
 Reed, H. B., 366, 410, 445
 Reichard, J. D., 730
 Remmers, H. H., 612
 Reynolds, M. M., 170
 Rice, J. M., 524
 Richards, I. A., 445
 Rinsland, H. D., 569, 571
 Rivlin, H. N., 728, 762, 795
 Roberts, K. E., 339
 Robinson, F. P., 14, 407
 Roe, A., 730
 Rogers, C. R., 610, 763
 Rogers, F. R., 282
 Rosenblatt, L. M., 312
 Ross, C. C., 281
 Rowland, H., 730
 Ruch, G. M., 570, 571
 Ruger, H. A., 460, 483
 Rugg, H., 728
 Russell, D. H., 313
 Russell, N. M., 339
 Rust, M. M., 171, 233, 246
 Ryan, W. C., 728, 795

 Saetveit, J. G., 282
 Salisbury, R., 339
 Salusky, A. S., 168
 Sandiford, P., 14, 519
 Sandin, A. A., 281
 Sangren, P. V., 569
 Sargent, H., 210, 611
 Sargent, J., 609
 Saul, L. J., 695
 Sawdon, E. W., 408
 Scammon, R. E., 21, 46
 Scates, D. E., 569
 Scheidemann, N. V., 281
 Schrepel, M., 410
 Schwartz, R., 207
 Scott, A. W., 84
 Scott, F., 208
 Seagoe, M. V., 170, 372, 408, 798
 Sears, R., 644, 646, 675, 694, 696
 Seashore, C. E., 261, 282
 Seashore, R. H., 82
 Sells, S. B., 484
 Shaffer, L. F., 338, 611, 694, 764
 Shaw, C., 730
 Shaw, R. F., 612
 Sherman, I. C., 22, 16
 Sherman, M., 22, 46, 120, 244, 637, 646
 Sheviakov, G. V., 698, 729
 Shirlev, M. M., 46, 83, 121, 167, 169, 170, 208
 Shock, N. W., 82
 Shuttleworth, F. K., 51, 52, 54, 81
 Simmons, K., 51, 81
 Simms, C. W., 781, 798
 Simon, T., 213
 Skeels, H. M., 122, 208, 245
 Skinner, C. E., 14, 365, 443, 519, 795, 796
 Skodak, N., 231, 245
 Sleight, W. G., 519
 Smith, R. R., 520

- Smoke, K. L., 445
 Snoddy, G. S., 366
 Solomon, J. C., 696
 Sorensen, H., 14
 Spearman, C. E., 222, 224, 244
 Spence, R. B., 570
 Spencer, D., 763
 Spock, B., 82
 Stacev, C. L., 391, 410
 Stafford, G. R., 763
 Stalmaker, J. M., 558, 571
 Stanger, M., 246
 Stanton, H. M., 14
 Stanton, M., 281
 Starch, D., 14, 359
 Stendler, C., 133, 169, 612
 Stevenson, G. S., 728
 Stewart, N., 256, 282
 Stimson, M., 721, 731
 Stoddard, G. D., 244, 264
 Stogdill, R. M., 612
 Stolz, H. R., 82, 168, 645
 Stolz, L. M., 82, 128, 645
 Stone, J. L., 611
 Strang, R., 82, 608, 609, 762, 763
 Straver, L. C., 47, 208, 291, 313
 Strong, F. K., 261
 Stroud, J. B., 14, 312, 337, 338, 407, 519
 Stuart, M., 210
 Sun, K. H., 45
 Super, D. F., 739, 761
 Svendsen, J., 172
 Swenson, F. J., 410, 503, 504, 519, 520
 Symonds, P. M., 120, 167, 570, 608, 610, 611, 612, 613, 644, 691, 729, 730
 Tasch, R., 613
 Taylor, G. A., 46, 345, 365
 Taylor, W. S., 657, 695
 Terman, I. M., 6, 171, 213, 214, 244, 247, 248, 250, 251, 281
 Thayer, V. I., 312, 728
 Thiele, C. L., 339, 503, 520
 Thompson, H., 44, 46, 81, 169
 Thorndike, F. L., 6, 223, 224, 244, 318, 327, 356, 381, 387, 391, 392, 410, 427, 490, 513, 514, 519, 521, 530, 570
 Thorndike, R. I., 172, 234, 246, 609
 Thorpe, L. P., 610, 738
 Thurber, J., 660, 661, 695
 Thurstone, L. L., 223, 224
 Tiegs, E. W., 569, 610, 696, 738
 Tilton, T. J., 445
 Tormey, T. J., 445
 Trainham, G., 82
 Traphagan, V., 764
 Travis, L. E., 648, 645, 796
 Traxler, A. E., 570
 Trow, W. C., 14
 Tryon, C. M., 167, 168, 586
 Tuddenham, R. D., 81
 Turner, M., 717, 730
 Tuise, P. L., 264
 Tyler, R. W., 410, 536
 Ulmer, G., 484
 Ullman, A. D., 646
 Umstuttd, J. G., 781, 798
 Updegraff, R., 47, 122, 156, 172, 208, 245
 Van Alstyne, D., 208, 610
 Vandell, R. A., 409
 Vanuxem, M., 244, 254, 255, 282
 Vaughan, W. F., 520
 Vernon, P. E., 612
 Waits, J. V., 410
 Waples, D., 797
 Wand, A. H., 410
 Warner, W. L., 167, 169, 731
 Warren, H. C., 614
 Washburn, R. W., 123
 Waters, R. H., 365
 Watson, B., 411
 Watson, G. B., 610, 731, 766, 796
 Webb, L. W., 519
 Weiss, L. W., 612
 Wellborn, F. I., 397, 410
 Wellman, B. L., 84, 122, 170, 171, 208, 245, 246
 Wells, I. L., 796
 Wertheimer, M., 482
 Wesley, F. B., 445
 Wesman, A. G., 521
 West, J., 167, 169
 White, R. W., 207, 210, 611, 717
 White, R. K., 696, 731
 White, W., 796
 Wickman, E. K., 610, 612, 717, 731
 Williams, A. M., 211
 Williams, H. M., 122, 208, 245
 Williams, J. F., 84
 Williamson, F. G., 763
 Willing, M. H., 539, 571

- Willoughby, R. B., 83
Witherington, H. C., 14
Witmer, H. L., 721, 729, 731
Witty, P. A., 73, 84, 365, 443, 795, 796
Wohlgemuth, A., 208
Wood, B. D., 244, 246, 250, 281
Woodruff, A. D., 14
Woodworth, R. S., 13, 365, 366, 371,
374, 393, 408, 409, 410, 433, 454, 482,
483, 490, 493, 512, 519, 521, 610, 695
Woody, C., 569
Woodyard, E., 122
Worcester, D. A., 408
Wright, N., 611
Wrightstone, J. W., 167, 548, 570, 571
Wrinkle, W. L., 281
Wylie, 264
Yerkes, R. M., 282
Yoakum, G. A., 409
Young, P. T., 312
Zachry, C. B., 312, 728, 762
Ziegfeld, E., 521, 608
Zinszer, H. A., 366
Zucker, H. J., 122, 612
Zyve, D. L., 264

SUBJECT INDEX

- Abilities, 527-531; of leaders, 152-154, 257-258; primary mental, 223-224; special, 261-265; spontaneous use of, 33-34
- Abstract ideas, 174, 181-186, 225, 417-418, 431-441
- "Accomplishment quotient," 270
- Accuracy test, 529
- Achievement, as a need, 150, 619, 642, measurement of, 543-547, relation of, to intelligence, 249, 254, 270-271
- Adequacy, needs, 623-624, 629, 642, 656, 697-698; *see* Emotional adjustment, Inferiority, Success
- Adjustment, factors in, 76; measurement of, 732-740, 760, 787; nature of, 614-646; of pupil, 697-727, 752-761; of teacher, 716-717, 721, process, 696, *see* Emotional adjustment, Personality adjustment, Social adjustment
- Adolescence, 57-61; emotional problems of, 98, 744-745; patterns of growth at, 49-55; sex differences in, 56-57, 65-69, social relationships in, 127-128
- Adult-child relationships, 110-113, 699-708, 716-721, 758-759
- Adults, adjustment of, 640-642, emotion in, 87-89, 95, 111-113; life stages of, 768-771; personality of, 708-710, skills of, 72-74
- Affection, 109-113, 116, 150, 618-619, 642, 699-700, 706-707, 775-776; *see* Needs
- Age score, 532, 534
- Aggression, 160-161, 647, 680, 700; by pupils in classroom, 139; by young child, 147-149, direct, 135-137, 683, 689-693; indirect, 149-150, 681-693; related to frustration, 635, 681-683
- Alcohol, 665
- Algebra, 266, 513
- Alternative Response Test, 525
- Analysis, and decision, 652-654; and synthesis of ideas, 437-438; of problem situations, 454, 652-653; of pupil errors, 557-560
- Anecdotal records, 578-581
- Anger, 91-97, 116-117, 635, 681-685; expression of, 93-95; in children's social relations, 91-93; methods of dealing with, 95-97, 115-117; value of, 95
- Annoying effects, 319, 388-392
- Anticipation, in development, 35
- Anxiety, revealed by tests, 590, 700; *see* Maladjustment, Neurotic symptoms
- Appraisal, of educational program, 522-571; of pupil adjustment, 572-613, 732-739; self, 789-791
- "Approximation and correction," principle of, 333
- Aptitudes, measurement of, 247, 261-265, 269-278
- Arithmetic, 253, 294, 296, 298, 513; insight in, 324-326; retention of, 395; transfer in, 502-504
- Army intelligence tests, *Army Alpha*, 217, 254, 257; *Army General Classification Test*, 217-219, 254-258
- Arthur Point Scale of Performance Tests*, 216
- Artistic capacities, 261-262, 263
- Aspiration, 89-90, 384-386, 624, 791
- Association, free, 598; in learning, 334
- "Atmosphere effect," 462-463
- Attention, span of, 174, 202-203; to errors, 353
- Attention-getting devices, 700
- Attitudes, effect of, on transfer, 509-511; of teacher toward pupil, 573-575; relation of, to information, 190-192, 204; relation of, to motives, 189-190, 300-301; study of, 598-601; toward teachers, 782-783, 794

- Autocratic vs. democratic management, 156-159, 287, 717; in school systems, 776, 783-784, 794
- Awareness, of frustration, 625, 631-635, 642; of motives, 668-670, 673-674, 686-688; of others, 125
- Behavior, at birth, 15; development of, 14-47; observation of, 560-561, 576-578, 741-743; problems, 717-721
- Bell Adjustment Inventory*, 589, 738
- Belongingness, 619, 642, 791
- Bennett Test of Mechanical Comprehension*, 262
- Bernreuter Personality Inventory*, 588-589, 739
- Binet-Simon Scale of Intelligence*, 213-214
- Birth, behavior after, 16-47, behavior before, 15-16
- Bodily changes, in growth, 48-57
- Bodily proportions, 48-56
- Brace Motor Ability Tests*, 66-67, 264
- California Test of Personality*, 589, 736-737
- Camp experience, 155
- Capacity, 238, 263-264, 486, *see* Aptitude, Intelligence
- Case history, 563-564
- Case study, 563-565, 746-752, 761
- Cephalo-caudal sequence of development, 21-22, 40
- Cerebral cortex, 16, 24
- Character Sketches*, 589, 737
- Characteristics, liked best in teachers, 716; of life phases, 768-771
- Child guidance clinic, 753-755
- Classification, of pupils, 276-277
- Classroom, behavior problems, 716-721; discussions, 134; groups, 276-277
- Clinical, case study, 564; *see* Case study
- Community, 710-713, 726; agencies of, 760
- Compensation, as adjustment device, 647, 679-680, 693, 726; in motor skill, 349
- Competition, 150-152, 161-162, 286-287, 714-715, 727
- Completion test, 526
- Comprehension, *see* Meanings, Understanding
- Compromise, as tension reducer, 654-655
- Concepts, abstract, 184-185, 433-437; development of, 182-183; moral, 200-201; of cause and effect, 183-184; of intelligence, 222-224; of time and space, 173, 187-189; *see* Abstract ideas, Meanings
- Conditioned response psychology, 9
- Conflicts, 60, 708; as source of anxiety, 88-89, 625-635, 653-654; cultural, 766-768, 793
- Connectionism, 9
- Constancy, of intelligence quotient, 221, 226-239; of personality traits, 139-141
- Control group methods, 488-490
- Cooperation, 575-576, 604; in teamwork, 126-127, 159, 286-287
- Coordination, *see* Motor development
- Cornell-Coxe Performance Test*, 216
- Correlation, 227-228
- Counselor, value of, 667-668, 753-755, 787, 794
- Coxe-Orleans Prognosis Test of Teaching Ability*, 265
- Creative imagination, 472-475, 478, 741; *see* Projective techniques
- Cue reduction, *see* Reduced cues, Symbols
- Culture and customs, contradiction in, 766-768, 793; effect of, on mental health, 621, 712-713, 765-768, 793; influence of, on social behavior, 130-134
- Curriculum, 375-376; and recreation program, 73; child's early, 15, effects of unsuitable, 715
- Curves and graphs, of forgetting, 393-394; of learning, 353-362, 438-439
- Daydreams, 192-200, 658, 660-663, 693
- Decision, 652-655, 692
- Deductive reasoning, 184, 223-224
- Defects, physical, 627, 618, 686; sensory, 722, 756, 761
- Defense reactions, *see* Compensation
- Delinquency, 259-260, 596, 686, 721-725
- Democratic procedures, *see* Autocratic vs. democratic management
- Dependence, 667-668, 693
- Derived scores, 531-534

- Detroit Mechanical Aptitude Examination*, 265
- Detroit Tests of Learning Aptitude*, 215
- Development, child, 15-211, effect of, on skills, 61-71; individual differences in, 69-70, learning as, 23, mental, 28-31, 173-211; of behavior, 15-47; of hand preference, 70, of prehension and locomotion, 62-63, of reasoning ability, 182-184, of sense of humor, 113-114; uniformity in, 32; *see* Emotional development, Motor development, Social development
- Developmental direction, laws of, 21-22
- Diagnosis, and intelligence test, 236, of behavior problems, 701, 751-752, 753, 761, of problems in learning, 361
- Diagnostic inventory or test, 513-544, 561-563
- Diary records, 743; *see* Anecdotal records
- Differentiation, in learning, 327-329, of behavior, 20, of emotion, 86-87, 111-115
- Disabilities, 261, 270-271, 350-351, 560, 563-565; *see* Defects
- Discipline, formal, theory of, 486-492
- Discovery, role of, in learning, 289-290, 349-351; self-, of principles, 389-392, 450-451, 459-463; through anecdotal records, 580-581
- Discrimination, *see* Sensation, Perception, Differentiation
- Discussions, children's, 131-135
- Displacement, of aggression, 685-688
- Distribution, of intelligence, 217-219; of practice, 379-381, 404
- Domination, as compensation, 680, as overprotection, 703-705, in leadership, 152
- Drawing, 253; interpretation of, 597
- Dreams, 192-193, 199-200; *see* Day-dreams
- Drill, 352; *see* Rote learning
- Dull or "dull-normal" child, 239, 723-724, 757; *see* Mental deficiency
- in, 104, 191-192, 269-270, 485, 536-538; *see* School practices
- Educational psychology, 1-12; central problem in, 412-416
- Effect, law of, 318-319, 387-392
- Efficiency, in learning, 340-342
- Egocentricity, 159-160
- Emotion, defined, 85; development of, 85-123; relation of, to frustration, 635-636, 789-790; relation of, to prejudice, 190-192, 438; relation of, to thinking, 189-190; *see* Emotional behavior
- Emotional adjustment, 98-104, 115-117, 182; tests of, 588-590, *see* Tension reduction
- Emotional behavior, development of, 85-123, *see* Expression of emotions
- English teaching, 320-321
- Environment, influence of, on adjustment, 621, 625-627, 641, 697-699, 708-721, 726-727, influence of, on intelligence, 226-235, 237-241, on language, 180-182, on learning, 284-287, on skills, 71-76; on social behavior, 151-159, *see* Heredity
- Escape mechanisms, *see* Withdrawal
- Essay examination, 556-559
- Examination, 711-715, *see* Essay examination, Objective tests
- Experience, adaptation and reorganization of, 511, conducive to fears, 98-101, relation of, to learning, 281-288, 401, relation of, to meaning, 416-417, 428-430, 441
- Experimental approach, to child study, 576
- Expert, role of, 219, 236, 241-242, 711, 752-755, 791
- Expiation and atonement, 678-679, 693
- Expression of emotions, decline of, 87-89, differentiation of, 86-87, 111-115; indirect, 88-89, 91-95, 116
- Lye movements, in reading, 342-343, 560-561
- Factual material, *see* Information
- Failure, 381-386, 624, 668
- Fear, 97-104, development of, 98-99, prevention of, 102-104; relation of, to everyday experiences, 99-101, 700; values of, 101-102

- Feeble-mindedness, 249, 254-255, 615;
see Mental deficiency
- Flexibility, as characteristic of intelligence, 225, 240; in performance, 349; in thinking, 460-461
- Form, of learning curves, 354-356; value of, in learning, 367-370
- Formal discipline, theory of, 486-487, 491-492
- Foster children, 229-231, 710
- Friendship, 144-146, 163, 792; see Sociometric techniques
- Frustration, 625-636, 637, 642; advantages of, 636-637; and accomplishment, 381-384; sources of, in teaching, 776-784
- Functional consequences, 317-319, 333-334, 640-642
- Gates Diagnostic Tests of Reading*, 560
- Gates Reading Readiness Test*, 267
- Generalization, importance of, for transfer, 498-511; process of, 430-441
- Generalized response or activity, 16, 20, 40
- Genius, 239, 251-252; see Gifted children
- Geography, 297, 439; see Social studies
- Geometry, 254, 513
- Gesell Schedules of Child Development*, 215
- Gestalt psychology, 9
- Gifted children, 248, 251-253, 722-723, 756, 761
- Goals, in learning, 305-309, 319-322; in problem solving, 630-632; incompatible, 627-628; of the individual, 617-621, 640-642; 647-649; 791; substitute, 649-652
- Goodenough "*Drawing-a-Man*" Test, 215
- Grade score, 533-534
- Grading, 151, 557-559; see Marking
- Grammar, 320-321
- Group, affinities within, 145-146; behavior, 125-127; discussions, 135, 184-186; factors in intelligence, 222-223; tests, 217-219, 236-237, 240
- Grouping, as learning aid, 370; for school work, 271-272, 276-277; see Organization
- Growth, in understanding, 296-297; mental, 173-176; physical and anatomical, 25-29, 48-57; readaptation of skills after, 27-29, 58-59; regressive, 769-771; see Improvement, Maturation
- "*Guess Who*" technique, 585-586, 605
- Guidance, and motor skills, 74-76, 340-362; clinic, 753-755, 760; educational, 235-237, 273, 277-278; of individual child, 732-764; principles of, in learning, 284, 340-411; vocational, 273; see Child guidance clinic, Vocational guidance
- Habits, 23-24, 38-39
- Haggerty-Olsen-Wickman Behavior Rating Schedule*, 591
- Handedness, development of, 70, 77
- Handicapped individuals, 76, 615, 721-722, 756, 761; see Defect
- Handwriting, 253; guidance in learning of, 345-347; scale, 529-530
- Health, examination, 751; mental, 697-731; poor, 721-722, 756, 761
- Height, growth in, 48-59, 76-77
- Heridity, in development of personality, 136-138, 681, 693; in development of skills, 78; influence of, on adjustment, 615; influence of, on intelligence, 226-235, 237-241
- History, 254, 331, 355, 395, 511; development of concepts in, 184-187; see Social studies
- Hobbies, 73-74, 79, 195-199, 771
- Home, see Parents
- Homogeneous grouping, in classes, 274-276
- Horace Mann-Lincoln Institute Social Distance Scale*, 582
- Humiliation, 637, 642, 647, 688
- Humor, see Laughter and humor
- Hunger, as physical need, 619-620
- Hyperactivity, 334
- Hypnosis, 633-634, 668-669
- Hypotheses, evaluation of, 463-466; formulation of, 459-463
- Ideas, 398, 413, 437-441, 671; see Abstract ideas, Concepts
- Identical "components," theory of, 493-494
- Identical "elements," theory of, 493
- Identification, 665-667, 693, 745

- Idiots, 249
- Imagination, 381; as source of fear, 98-101, 115-116; creative, 741; *see* Make-believe
- Imbeciles, 249
- Improvement, and learning, 297-298; in handling behavior problems, 720-721; in mental health of teachers, 786-794; in motor skills, 74-76, 349-352; knowledge of, 386-387; of education, 522-524; of mental faculties, 486-492; rate and limits of, 40-42, 74; *see* Learning
- Incentives, 301-303
- Incidental learning, 298-300
- Independence, 619, 642, 703, 775
- Individual differences, in emotional reaction, 93; in intelligence, 220, 226-235, 247-249; in language development, 173-182; in motor development, 69-70, 78; in reasoning ability, 475-476; in social response, 135-137, 143-144
- Individuation, 21, 45-46
- Inductive reasoning, 184, 223-224
- Infant behavior, *see* Behavior at birth
- Inferiority, feelings of, 679, 698, 721-726, 757-758, 761; *see* Insecurity
- Information, about children's interests, 603-604; children's, 187-189, evaluation of, 455-457, organization of, 375-376, 457, 479, transfer of, 494
- Inhibition, 673, 681
- Insecurity, feelings of, 97, 101, 112; occupational, of teachers, 779-780, 794
- Insight, and self-appraisal, 675-676, 789-790; in creative invention, 474-475; in learning, 322-326, 333
- Instability, emotional, 716-717, 727, *see* Neurotic symptoms
- Instruction, *see* Guidance in learning
- Integration, 327, 329-330, 358, 362, *see* Organization
- Intellectual deviates, 272; *see* Gifted children, Mental deficiency
- Intelligence, 212-283, and moral adjustments, 259-261; and personality traits, 257-258; defined, 225-226, 240, 242-243; measurement of, 212-219, 247-249; relation of, to motor ability, 261; relation of, to scholastic achievement, 249-254, 277; relation of, to vocational success, 254-257, 277; *see* free, 190-192
- Intelligence quotient, 220-242, 247-261, 269-278
- Interests, and emotional susceptibility, 90-91; and personality adjustments, 624-625; in radio programs, 196-199; inventory of, 265-266, 745-746; play, 71-73, 195-196; relation of, to learning, 300-307; stimulation of, 73-76, 775, 793; study of children's, 601-604, 606
- "Internal consistency," test of, 540
- Interrelation, between aspects of development, 32-33, 124, 134-135; between learning products, 327; of motor abilities, 69-70; 78; of needs, 622-625
- Interview, with child, 592-593, 745, 760; with parents, 743-745
- Invention, 472-474
- Isolated child, 581, 724, 757, *see* Social adjustment
- Jealousy, 93, 150, 706-707
- Knowledge, of improvement, 386-387; *see* Information, Meanings
- Kuhlmann Test of Mental Development, 215
- Language, development of, 175-176, 427-429; limitations of, 416-421
- Laughter and humor, 113-114, 680
- Law, of developmental direction, 21, 40, of effect, 318-319, 387-392
- Leadership, 152-154, 162-163; and intelligence, 250-261
- Learning, age for effective, 17-18, 23-31, 40, 290-295, 308-309, and motivation, 298-307, 309, as adjustment, 639-642; as process, 295-298; distinguished from growth, 23-24; motor skills, 25-29, 61-79, 310-362; nature of, 288-339, needs and opportunities for, 284-288, principles of guidance in, 284, 300-309, 340-411; relation of, to intelligence, 249-252, relation of, to reasoning, 449-450; rote, 325, 335; *see* Improvement, Practice
- Lester International Performance Scale, 216

- Level of aspiration, 384-386, 624
Lewerenz Tests of Fundamental Abilities of Visual Art, 263
 Likes and dislikes, of children, 601-604, 606-607
 Locomotion, development of, 27-29, 62, 291-292
 Logic-tight compartments, 671

MacQuarrie Test of Mechanical Ability, 262
 Make-believe, 193-199, 202; *see* Imagination
 Maladjustment, 565, 616-617, 733-739, 753-756, 760, 786; *see* Adjustment problems
 Manual guidance, 345-347
 Marking, 151, 304; *see* Grading
 Matching test, 526
 Mathematics, 355; transfer in, 505-507; *see* Arithmetic
 Maturation, and emotional susceptibility, 90; and learning, 21-29, 290-295, 308-309; and mental growth, 29-31, 41, 175-182; and motor skills, 62-64, 76; and social response, 128-129; neural, 15-17, 24
 Maze learning, 216
McAdory Art Test, 263
 Meaningful activities, *see* Goals in learning
 Meanings, development of word, 179-180, 412-441; relation of, to context, 419-421; relation of, to experience, 180-182, 416-417
 Means-end relations, 306, 320-321, 479; *see* Goals
 Measurement, in school program, 522-567; of adjustment, 732-740, 760; of intelligence, 212-241
 Mechanical, aptitude, tests for, 262-263; *see* Ability
 Mechanisms, adjustment, 655-656, 692; *see* Tension reduction by indirect methods
Meier-Seashore Art Judgment Test, 263
 Memorizing, *see* Learning
 Memory, 176-178, 488-490; *see* Retention
 Menarche, relation of, to growth, 49-57
 Mental age, 220-222, 271-273
 Mental deficiency, 248-250, 255
 Mental development, 17, 173-211
 Mental disorder, 658, 708-710, 739-740, 754-755, 777
 Mental faculties, theory of, 486-487, 491-492
 Mental health, hazards, 697-731; improvement of, 786-791; of the teacher, 765-799
 Mental tests, *see* Measurement
Merrill-Palmer Scale, 215
 Methods, in education, 298-309; of control, 155-159, 716; of improving mental health, 786-794; of improving transfer, 506-509; of studying children, 572-613, 742-713; of tension reduction, 647-693; scientific, 2-3; *see* Guidance
Minnesota Mechanical Ability Tests, 262-263
Minnesota Multiphasic Personality Inventory, 739
Minnesota Preschool Scale, 215
 Models, use of, in learning, 344-349
Modern School Achievement Test, 544-546
 Moral, adjustments, 654, 691; concepts, 200-201; standards, 132-133, 627-628, 642, 707-708, 726, 759
Morgan-Murray Thematic Apperception Test, 596-597, 741
 Motion pictures, 345, 430, 441
 Motivation, 300-307, 309, 331, 632-635, 638-639, 789
 Motor development, 61-70; and play activities, 71-79; sex differences in, 64-69; *see* Skill
 Mueller-Lyer illusion, 499
 Multiple-choice test, 521-525
 Muscles, 22-23; *see* Motor development
 Musical, aptitude tests, 261-262

 Nature and nurture, *see* Heredity and environment
 Needs, 617-621, 622-624, 639-642, 789; basic personality, 618-619, 621-622; for learning, 284-286; organic, 618, 621-622, relation of, to environment, 621; relation of, to interests, 624-625; thwarted, 625-631, 637-638; unconscious, 631-635
 Negative transfer, 512
 Negativism, *see* Resistance

- Neurotic symptoms, 149, 611, 685-691, 734, 789
- Nonverbal test, 217-219, 240
- Norms, use of, 531-535
- Nursery school experience, effects on intelligence, 231-233; effects on social development, 155
- Objective, attitudes, 466; tests, 524-527
- Observation, for appraisal of pupils, 560-561, 576-578; learning by, 311-345, 362; methods of, 578-581, 711-743, 760
- Obstructions, as causes of anger, 92; as stimulus to thinking, 326; *see* Frustration
- Ohio Social Acceptance Scale*, 582
- Open-mindedness, 461
- Opportunities, for learning, 284-288
- Organization, in learning, 326-330, 367-370, 398-399, of abilities, 213, of skills, 78-79, teachers', 786-787
- Orleans Algebra Prognosis Test*, 266
- O'Rourke Mechanical Aptitude Test*, 262
- Otis Self-Administering Tests of Mental Ability*, 250
- Outcomes, 321; *see* Results
- Outlining, as learning method, 458-459
- Overlearning, 391-395, 404
- Overprotection, of child, 703-706
- "Pacing" in learning, 358-359; *see* Readiness
- Parent, and child resemblance, 227-231; influence on child's adjustment, 697-708, influence on child's fears, 100-101; influence on child's moral code, 200-201, 759, overprotection of child by, 703-706, rejection of child by, 699-703, report to, 579
- Part vs. whole learning, *see* Whole vs. part learning
- Pattern, emergence of, 322-323; of action, 347-349, of behavior, 76-77, 127; of growth, 49-52; of intelligence, 223
- Percentile, 221-222, 533
- Perception, as primary ability, 223; transfer of training in, 490
- Performance, tests of, 216-217, 347-349, 375
- Personality, and intelligence, 257-258; and use of adjustment mechanisms, 659-660, 666, 671-672; development of, 18-20, 726-727; effect of poverty on, 697-699; effect of school practices on, 713-721; needs, 618-622; tests of, 551, 588-590, 605; traits, 226, 716-717, 732; *see* Adjustment
- Phantasy, *see* Daydreams
- Physical capacities, 48-81; test of, 263-264
- Physiological components, of emotion, 85
- Physiological limit, in learning, 356-357
- Pintner-Paterson Scale of Performance Tests*, 216
- Plateau, in learning curve, 357-360
- Play activities, and motor development, 71-72; "make-believe" in, 193-196, 662-663, 666, 686-687; number of, 72-74
- Play therapy, 594-596, 666
- Pleasure, 104-109
- Point scale, 221-222
- Porteus Maze Test*, 216
- Poverty, 697-699, 726, 761
- Power test, 528
- Practice, distribution of, 379-381, 404; need for, 351-352, *see* School practices
- Praise, and reproof, 107-109
- Precision, 351-352, 362
- Prehension, 62
- Prejudice, 189-192, 461-466, 598-599, 671
- Prestige, 150, 162
- Prevention of maladjustment, *see* Adjustment
- Problem solving, 416, 449-479, 652-655
- Procrastination, 664
- Prognosis tests, 265-269, *see* Aptitude tests
- Projection, 672, 674-677, 693
- Projective techniques, 593-598, 606, 740-741; *see* Play therapy
- Propaganda, 469-472
- Proximo-distal sequence, in development, 22, 40
- Psychoanalysis, 19-20, 788
- Psychotherapy, 634, 787, 794
- Punishment, as treatment of behavior problem, 718-720, influence of, 318-319, 387-392, reproof as, 107-109

- "Pupil Portrait" technique*, 586, 589
 Purposes, in learning, 305-309, 318-322; of education, 485, 522-524; of intelligence tests, 269-278; *see* Goals
- Quality test, 529-530
 Quarrels, 149
 Questionnaires and self-inventories, 265, 732-740
 Quotient, *see* Intelligence quotient
- Radio programs, 196-199, 202
 Range test, 529
 Rating, as evaluation, 587; by pupils, 581-586; scales for teacher use, 590-592, 752
 Rationalizing, 42, 668-672, 693; distinguished from lying, 669-670
 Readiness, 40-41; principle of, 25-31, 41-42, 181; tests of, 266-269
 Reading, 253-254, 293-295, 416; diagnostic inventory for, 562-563; disability, 349-351, 382-384; instruction in, 312-343; tests, 266-269, 539, 544; vs. recitation, 376-379; *see* Readiness
- Reasoning, 446-484, 652; development of, 182-192, 446-449, 513-514; transfer of training in, 491, 501-502
 Recall, 403; aided by anecdotal records, 578; *see* Retention
 Recall test, 527
 Recitation, in learning, 376-379, 404
 Record, of observation, 742-743; permanent or cumulative, 746-761
 Recreation, for teachers, 784; program, 711; *see* Hobbies
 Reduced cues, 174, 202, 328-329; *see* Symbols
 Reference books, use of, 457
 "Referents," 123-425, 440; *see* Meanings, Symbols
- Regression, as a method of adjustment, 658-660, 693; in child development, 36-42
 Rejection, of child, 699-703, 726
 Relationships, in learning, 330-331, 333-334, 398, 422-423; parent-child, 758-759
 Reliability, of grading essay examinations, 557-559; of questionnaires, 735; of tests, 510-542, 552
 Remedial treatment, *see* Treatment
- Repression, 672-674, 693; distinguished from inhibition, 673
 Reproof, 107-109
 Resemblances, among friends, 145; among relatives, 226-221
 Resistant behavior, 93-94, 135-137, 147-150, 160-161, 233; *see* Aggression, Negativism
 Response, discovery of correct, 349-351; social, 135-137
 Restrictions, excessive, in classroom, 715-716, 727; on teachers, 780-783, 794
 Results, of education, 303; of punishment, 163; *see* Transfer of training
 Retention, 392-404; *see* Memory
 Retroactive inhibition, 399-403
 Reversal-formation, 672-673, 677-678, 693
 Reversion, *see* Regression
Revised Stanford-Binet Scale, 213-214, 247-249
 Reward, 387-392, 718-720
Rogers Physical Capacity Tests, 264
Rogers Test of Personality Adjustment, 589
Rorschach, ink-blot test, 594, 740, 787
 Rote learning, 325, 335, 515
Ruch-Popenoe General Science Test, 396
- Salaries, for teachers, 777-779, 794
 Satisfaction, at various life phases, 768-771, of teachers, 774-776; vicarious, 194-195, 666-667
 Satisfying effects, 318-319; *see* Law of effect
 School, appraisal of pupil progress, 269-277, 572-607; environment, 233-234; practices, 154-159, 231-235, 713-721, 727, subjects, 395-396
 Schools, evaluation in, 522-613; function of, 287-288, objectives of, 104, 195-496, 536-538, 575, of psychology, 9-11, 13
 Science, of mental measurement, 212; method of, 1-2
 Scores, derived, 531-534; raw, 531; *see* Norms
Seashore Musical Talents Test, 261-262
 Security, needs, 623, 642, 656, 697-699, 711-712; *see* Emotional adjustment, Social adjustment, Needs

- Selection, in learning process, 299-300, 317-318; in problem solving, 454-455
- Self-deception, *see* Rationalizing
- Self-esteem, 682-683; bolstered, 667, 759, 775-776; factors lowering, 712-713
- Sensory, defects, 722; functions, 17-18, 175, 201-202; *see* Handicapped individuals
- Sex, conflicts, 60, 656-657, 771-773, development of sex interests, 59; differences, 52-57
- Shyness, 135-138, 161, 757
- Siblings, rivalry of, 150, 707
- Singing, 31, 46, 292-293
- Skeletal age, 55-56
- Skills, acquisition of, 61-79, 340-362, adaptation of, during growth, 27-29, 58-59; and educational program, 71-74; effect of, on social adjustment, 155-156; transfer of, 501; *see* Learning, Motor development
- Social, adaptability and intelligence, 257-258; adjustment, 76, 151-163, 572-607, 616, 617-693; approval, 619, 624, 642; relationships, 125-130
- Social behavior, 141-142, 159-163, development of, 121-172, consistency in, 139-141
- Social studies, 184-192
- Social utility movement, 195-196
- Socioeconomic status, influence of, on social behavior, 131-134
- "Sociogram," 583-585
- Sociometric techniques, 145-146, 581-588
- Special abilities and aptitudes, 261-264
- Specialist, *see* Expert
- Speed tests, 528-529
- Spelling, 253-254, 504-505, 512, 513
- Stanford-Binet Scale, *see* Revised Stanford-Binet Scale
- Standardized tests, 527-535, 543-552
- Statistical methods, for studying intelligence, 222-224, for studying resemblances, 227-228
- Stereotypes, 461-466
- Stimulus patterns, 135
- Stimulus-response psychology, *see* Connectionism
- Strong Vocational Interest Blank, 265
- Structure, 368; *see* Organization, Pattern
- Subjects, school, relative value of, 313-314; relation of intelligence to success in, 253-254
- Sublimation, 655-657, 693
- Substitute goals, 649-652, 692
- Success, 106-107, 381-386
- Syllogism, 462-463
- Symbols, 174, 202, 415-416
- Sympathy, 135-144, 745
- Systems of psychology, *see* Schools of psychology
- Teacher-made test, 552-556
- Teachers, appraisal by, of pupil progress, 572-607, attitudes of, 601, 717-718, 745, function of, 341-342, influence of, 190-192, 716-717; mental health of, 765-799; methods of, in handling class, 716; satisfactions of, 774-776
- Teaching, social significance of, 771-775, 793
- Telegraphy, 359-360
- Temper tantrums, 87, *see* Anger
- Tension, reduction of, 639-697
- Tenure, professional, 779-780, 794
- Terman Group Intelligence Test, 266
- Test construction, *see* Measurement
- Tests, 213-283, 522-571; *see* Measurement
- Thematic Apperception Test, *see* Morgan Murray Thematic Apperception Test
- Thinking, 453-467, 475-479, influence of emotion on, 189-192
- Thorndike Scale for Quality of Handwriting, 529-530
- Thwarting, of needs, 625-635, 642, 682-684; *see* Frustration
- Time, sense of, 173, 187
- Training, in bladder control, 23-24; vs. maturation, 291-293; *see* Guidance, Learning, Transfer
- Transfer of training, 485-521; as criterion of insight, 323-324, negative, 512-513; relation to intelligence, 514-515
- Treatment, of adjustment problems, 631, 755, of classroom behavior problems, 718-721, 759-761
- Trial and error, in learning, 315-317, 335

- True-false test, *see* Alternate response test
- Tuition, *see* Guidance, Learning
- Twins, 229
- Unconscious, conflict, 632-635; needs, 631-632; process, 673-674; *see* Awareness
- Understanding, and emotion, 89-90, 115, 189-192, 204; and retention, 396-399; and transfer, 516; improvement of, 182-192, 423-430; of relationships, 331; socioeconomic differences, 133-134; the child, 91, 115-116, 572-613, 732-764; *see* Meanings
- Unmarried, man, problems of, 771-772, 793; woman, problems of, 772-773
- Urges, human, 617; *see* Motive, Needs
- Validity, of tests, 538-540, 552, 566-567, 734-735
- Van Alstyne Picture Vocabulary Test, 215
- Verbal ability, 178-182, 223-224, 367-381; methods of tuition, 352-353; tests of intelligence, 217-219; *see* Language
- Vision, 17, 173, 202
- Visual, aids, in teaching, 429-430, 441; abilities in intelligence, 223
- Vocabulary, development of, 179-180, 425-428; load in learning, 418, 440-441
- Vocational, guidance, 273; success and intelligence, 254-257
- Wants, *see* Needs
- Wechsler-Bellevue Intelligence Test, 216
- Weight, growth in, 48-59, 76-77
- Whole vs. part learning, 347-349, 370-375
- "Whole-heartedness and gradation," principle of, 36-37, 116
- Winnetka Scale for Rating School Behavior and Attitudes, 590-591
- Withdrawal, as method of adjustment, 161, 655-656, 658-664, 693, 717-718; *see* Shyness
- Work, as punishment, 718-720; pressure of, on teachers, 573, 776, 794; *see* Vocational guidance
- Wrightstone Tests of Critical Thinking, 547-549

